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North Central Forest Experiment Station

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Report on the Socioeconomic Roundtable Convened by the Chequamegon and Nicolet National Forests

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EXECUTIVE SUMMARY

The Socioeconomic Roundtable for the Chequamegon and Nicolet National Forests was charged with identifying methods and principles for evaluating the social and economic impacts of ecosystem management on the region. Four products were developed by the Roundtable. The first product was a set of recommendations about the use of available analytical procedures for analyzing socioeconomic impacts, and the need for new or additional procedures. Roundtable participants identified tools currently available for evaluating impacts in each of 14 socioeconomic impact categories. From the list of available tools, "best" tools were selected in each impact category (table 1, page 20). Factors such as availability of training and support, cost, and data requirements were used to help to define "best."

The second product was a set of recommendations about data sources available to the Forests for use in establishing baseline conditions for future socioeconomic impact analysis (table 2, page 27).

For the third product, Roundtable participants were asked to reach consensus on the *directional* impacts of ecosystem management. This was accomplished at two different levels or scales. First, participants discussed *national* impacts of implementing ecosystem management on *all* National Forests. National impacts were estimated using Forest Service management of the late 1970's and early 1980's as the basis of comparison. Second, participants were asked to indicate impacts on the *Wisconsin National Forests* of four ecosystem management scenarios. The basis of comparison was the current, approved forest plans for the Forests. The national-level discussions provided a context for the Wisconsin discussions and in many instances have relevancy to Wisconsin. At both national and State levels, Roundtable participants sought consensus only on the directional impacts that might occur, not on the magnitude of the change or the relative importance of the socioeconomic impact categories. The magnitude of any impacts can be estimated only through further analysis or research. Questions related to the relative importance of the changes can be answered only in partnership with the public.

Highlights from the national discussion include:

- Participants perceived that ecosystem management would result in reduced volumes of traditional timber product outputs, which, in the short term, would cause a decline in employment and economic activity. However, there was some sense that this decline may only be short term and that some jobs would be created in the long term as a result of other impacts from ecosystem management.

- Roundtable participants generally felt that ecosystem management would produce higher quality recreational experiences, but they were concerned that increases in quality would be achieved only through decreases in the quantity of recreational opportunities available to the public.

- Social and cultural impacts (culture and tradition, social vitality and stability) were seen to decrease in the short term because of the reduction in employment, but Roundtable participants could not reach consensus on long-term impacts because we do not yet understand how the many other factors affecting quality of life will be affected by ecosystem management.

- Roundtable participants generally felt that ecosystem management would have positive impacts on how the Forest Service interacts with individuals or groups outside the Agency (participatory planning and leadership in management).

- National Forest management efficiency would decline in the short term as Agency staff learn the new processes and tools necessary to implement ecosystem management.

- In the long term, ecosystem management would result in an increase in ecosystem health and productivity on public lands in the U.S. However, several Roundtable participants cautioned that we need to consider the impacts of U.S. forest policy decisions on global ecosystem health and not just confine our analysis to lands within our borders.

Highlights from the Wisconsin National Forests discussion included:

- *Perceptions* of a changing wood supply, or other impacts, may be as important, in the short term, as the actual *facts*. In the face of uncertainty, most people are cautious, if not wary, particularly when making investment decisions.

- Except for Scenario D (the maximum wood product outputs scenario), none of the scenarios were expected to result in positive economic impacts. Roundtable participants anticipated that these scenarios would result in lower timber product outputs, causing a decline in employment, at least in the short term.

- Roundtable participants could not reach consensus on long-term recreational impacts of the management scenarios. In most cases, they felt there would be a change in recreational opportunities—for example, from motorized or consumptive recreation to less intensive, nonconsumptive recreation—but did not have enough information to determine if the new recreational opportunities would balance those lost.

- Although Roundtable participants were able to reach some consensus on amenity values, it was an uneasy consensus. Participants thought that the public would perceive a decline in amenity values because they (the public) generally value "neatness" in a forest landscape and the application of ecosystem management would result in "messy" forests.

- In general, Roundtable participants felt that the direction of impacts on the quality of life, culture and tradition, or social vitality and stability would follow the direction of impacts on the economy. However, we do not yet understand how the many other factors affecting society would be affected by these or other management scenarios.

- The lack of information on non-timber product outputs was so overwhelming that Roundtable participants could not reach any consensus on impacts from the management scenarios in this category.

- One of the basic tenets of ecosystem management is that people are involved in all phases of forest planning and decisionmaking. Because of this focus on citizen involvement, Roundtable participants generally felt that there was some potential for increased participatory planning. However, they cautioned that if ecosystem management results in any change in Forest Service policy that takes decisionmaking away from the Forests and places it at some higher level in the Agency (at the regional or national level), local publics will become disenfranchised and participatory planning will be adversely affected.

- Although Roundtable participants could not reach consensus on the impacts of any scenario on leadership in management, they did feel that the role of the Forest Service as a leader in public land management would be enhanced to the extent that ecosystem management is seen as a successful resource management paradigm.

- For only two scenarios were participants able to reach consensus on impacts on ecosystem health and productivity. The lack of consensus in this category is due to a lack of information and the lack of a common definition of ecosystem health.

Finally, the Roundtable co-chairs developed a series of recommendations relating to the human dimensions of ecosystem management. Five broad recommendations were made, and action items were identified for each recommendation:

1. The Wisconsin National Forests should adopt a philosophy that places equal emphasis on social, economic, biological, and physical impacts when formulating and evaluating resource management decisions.

2. The Wisconsin National Forests should reassign responsibilities or hire additional staff to provide the analytical skills necessary for evaluating social and economic impacts. Action items include: (a) hire an economist, (b) hire a rural sociologist, and (c) provide training for staff.

3. The Wisconsin National Forests should begin immediately to assess the magnitude of the social and economic impacts resulting from their management decisions. Action items include: (a) establish a strategic information base, and (b) as a pilot project, quantify or describe the magnitude of the socioeconomic impacts from the implementation of one ecosystem management scenario.

4. In the next round of forest planning, the Forest Service must increase its emphasis on social and economic impacts. The Wisconsin National Forests should serve as a laboratory for testing planning methods and tools. Action items include: (a) follow through with the roundtable process as a way of identifying desired future conditions for the next round of planning, (b) begin to evaluate social and economic impacts for alternative desired future conditions identified in Recommendation 4a using the information identified and tools tested in Recommendation 3.

5. The Wisconsin National Forests should cooperate in and support research to enhance the socioeconomic analysis being conducted on the Forests. A list of 12 potential research questions was developed (page 31).

This summary simplifies many of the strongly debated and complex issues discussed. The reader is encouraged to read the full report of this Socioeconomic Roundtable to appreciate the perceptions and insights shared by the participants.

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Report on the Socioeconomic Roundtable Convened by the Chequamegon and Nicolet National Forests

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Chapter 1—INTRODUCTION

To understand why there was a Socioeconomic Roundtable for the Chequamegon and Nicolet National Forests, we have to return to the 1970's, when Congress passed two pieces of legislation—the Forest and Rangeland Renewable Resources Planning Act and the National Forest Management Act. This legislation provides direction for the Forest Service to achieve a balance of production, use, and protection of renewable resources by preparing forest land and resource management plans (forest plans). The Chequamegon and Nicolet National Forests completed their forest plans in 1986.

Shortly after they were approved by the Agency, these plans were appealed by several individuals and groups. The appellants' primary complaint was that neither forest plan addressed the need for establishing large contiguous areas for the maintenance and enhancement of biological diversity. In January 1990, Forest Service Chief F. Dale Robertson issued partial remands for the plans, requiring that both Forests further analyze and develop forest plan amendments that thoroughly address biological diversity. Chief Robertson's instructions included a requirement to establish a "committee of experts" to address the maintenance and enhancement of biological diversity. The Chequamegon and Nicolet National Forests did consult with a "committee of experts" on biological diversity using a roundtable process—The Wisconsin National Forest Roundtable of Biological Diversity (Crow *et al.* 1994).

Early in the organization of the Roundtable on Biological Diversity, the Roundtable co-chairs and Forest staff recognized the need for more than one roundtable, and specifically the need for a second to examine the potential social and economic impacts of recommendations made by the Roundtable on Biological Diversity.

In December 1992 and January 1993, the Chequamegon and Nicolet National Forests selected three co-chairs to organize and conduct a Socioeconomic Roundtable: Jan Harms, Professor in Forest Economics, University of Wisconsin-Stevens Point; Pamela Jakes, Project Leader, Social and Economic Dimensions of Ecosystem Management, North Central Forest Experiment Station, USDA Forest Service; and John Stoll, Professor in Public Affairs, University of Wisconsin-Green Bay. Working with a team from the two Forests, they defined the mission of the Socioeconomic Roundtable as the discussion of methods and principles for evaluating the social and economic impacts of ecosystem management in the region. Notice that the mission was expanded over that envisioned during the Roundtable on Biological Diversity—from evaluating potential impacts resulting from implementation of recommendations of the Roundtable on Biological Diversity to evaluating the local and regional impacts resulting from the implementation of ecosystem management. This shift in focus was necessary so that the Forests could receive input from the Socioeconomic Roundtable on impacts resulting from potential Agency directives being discussed at that time (including orders to reduce clearcutting and to eliminate below-cost timber sales).

The products from the Socioeconomic Roundtable were to be threefold:

1. Recommendations about the use of available procedures for analyzing socioeconomic impacts, and the need for new or additional analytical procedures.

2. Recommendations about data sources currently available to the Forests that could be used to establish baseline conditions for further socioeconomic impact analysis.

3. Estimates of the potential directional effects on socioeconomic variables from the implementation of ecosystem management on the Wisconsin National Forests.

In the following chapters, we present Roundtable findings, followed by recommendations to the Forests, and some final reflections of the co-chairs on the human dimensions of ecosystem management. For more information on the organization of the Socioeconomic Roundtable, see Appendix A. The process we used to select Roundtable participants, and a list of participants, are found in Appendix B. The 14 socioeconomic impact categories are described in Appendix C. Finally, the five Wisconsin management scenarios are described in detail in Appendix D.

Chapter 2—SOCIAL AND ECONOMIC IMPACTS OF ECOSYSTEM MANAGEMENT

The original mission of the Socioeconomic Roundtable, as envisioned by staff from the Wisconsin National Forests, was to quantify potential social and economic impacts of ecosystem management. However, so little is known about the impacts of forest management decisions on social and economic values, that the co-chairs knew there was no way Roundtable participants could quantify socioeconomic impacts in 3 or 4 days, even if they were "experts." Co-chairs and Forest staff also knew that no *one* ecosystem management scenario could be developed for the Forests; rather, ecosystem management is a management philosophy that can be applied to a range of management scenarios. However, Roundtable co-chairs believed that participants in a socioeconomic roundtable could work to reach consensus on the directional impacts that might occur in various socioeconomic categories under alternative management scenarios.

To accomplish this task, a definition of socioeconomic impacts was needed. The co-chairs conducted a Delphi survey of Roundtable participants and identified 14 socioeconomic impact categories that were used throughout the Roundtable discussions. Impact categories included:

- Ecosystem health and productivity
- Local culture/traditions
- Social vitality and stability
- Participatory planning
- Economic structure/activity
- Economic health
- Timber product outputs
- Leadership in management
- Amenity values
- Recreation and aesthetics
- Non-timber forest product outputs
- Economic efficiency
- Quality of life/economic and social well-being
- Employment

In analyzing socioeconomic impacts, Roundtable participants first looked at potential national impacts of the Forest Service managing all National Forests according to the principles of ecosystem management. This was followed by an assessment of management scenarios for the Wisconsin National Forests. The co-chairs and Forest staff developed five Wisconsin management scenarios. These scenarios were developed as only a framework for estimating directional socioeconomic impacts. Their appearance here *does not* imply any commitment by the Forests to follow any of these scenarios—they *are not* intended for use in the forest plan review or revision process for either the Chequamegon or Nicolet National Forests.

2.1 The National Exercise

The Roundtable began with participants working to reach consensus on the national impacts of the Forest Service managing the National Forests according to the principles of ecosystem management. In spite of our efforts to keep the focus of the discussions on the national scale, much time was spent talking about ecosystem management on the western National Forests. One reason the West figured so prominently in our discussions was the perception held by some participants that implementation of the Agency's ecosystem management initiative was further along on the western National Forests than on the eastern Forests (the Roundtable took place in June 1993). In addition, the President's Forest Summit had been held only weeks earlier in Oregon, and that event colored some of the discussion.

Figure 1 shows where participants could reach consensus on the directional impacts of the Forest Service managing the National Forests according to the principles of ecosystem management. We were able to reach consensus on 15 of 28 possible impact categories. Roundtable discussions indicated that although some information is available about the impacts of forest management decisions on economic values, relatively little is available about impacts on broader social values.

Note that the arrows in figure 1, and in the figures that follow, indicate the direction of change only, but tell us nothing about the magnitude of change. Furthermore, although Roundtable participants indicated how they felt about the relative importance of the categories

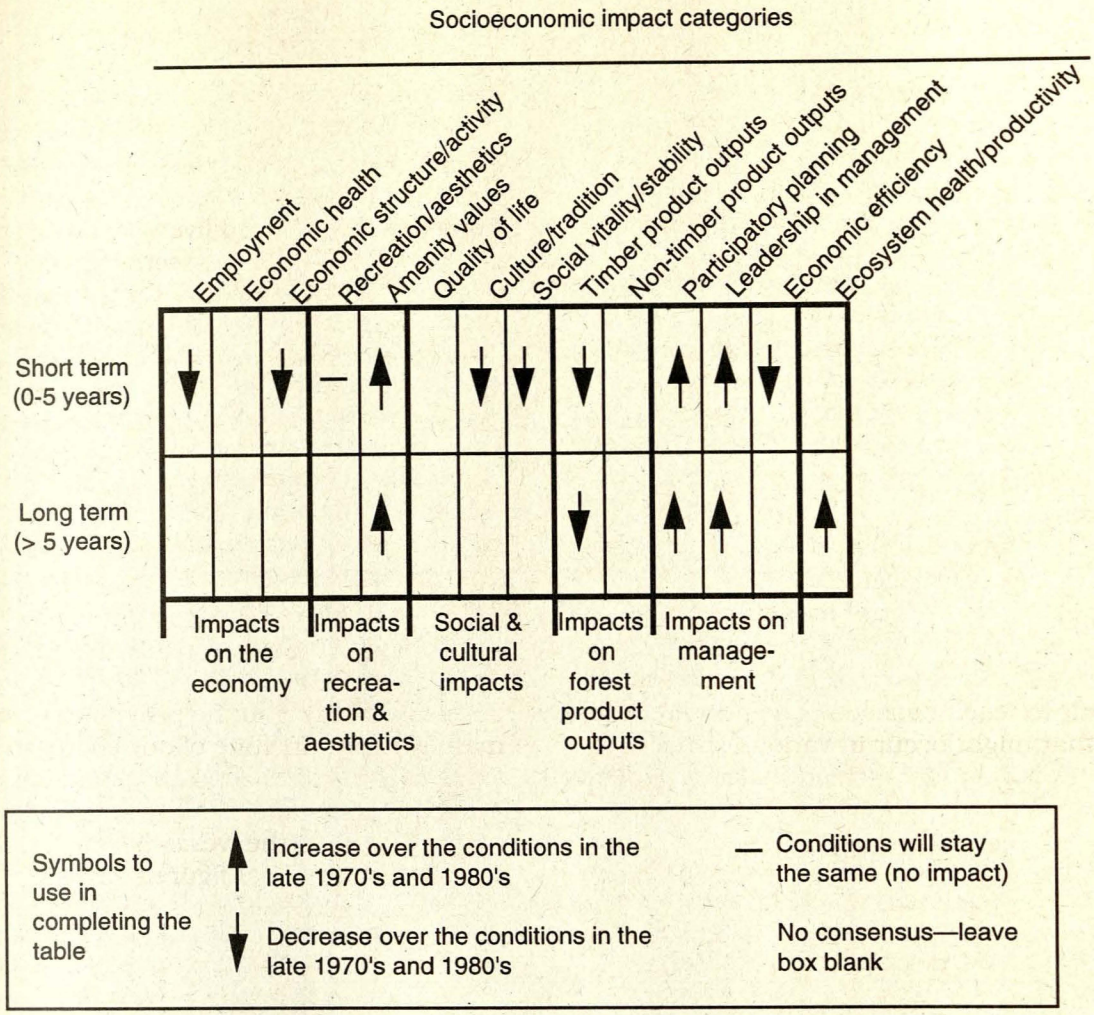

Figure 1.—*Directional socioeconomic impacts of the USDA Forest Service fully implementing ecosystem management on all National Forest lands.*

when they suggested where the Forests should start in their socioeconomic impact analysis (figs. 7 and 8), we do not know how a more representative group of Forest users would rate the relative importance of the 14 socioeconomic impact categories. So, in figure 1, although there are the same number of up arrows as down, it is not appropriate to say that increases balance decreases because nothing is known about the magnitude of the changes. Questions related to the magnitude of the changes will be answered through further analysis or research. Questions related to the relative importance of the impact categories can be answered only through public involvement in forest management decisionmaking—they are questions of values and ethics.

What follows is a summary of the discussion that took place as Roundtable participants tried to reach consensus. Much of this discussion anticipates some of the points raised later when we discuss directional impacts from different Wisconsin management scenarios. The single biggest obstacle to reaching consensus was not some indisputable stand taken by participants about what was actually going to happen, but agreement that consensus was impossible because there is so little concrete information on the linkages between forest management actions and socioeconomic conditions. Highlights from the discussion include:

- Participants perceive that ecosystem management would result in reduced volumes of traditional timber product

outputs, which, in the short term, would cause a decline in employment and economic activity. However, there was some sense that this decline may only be short term, and that some jobs would be created in the long term as a result of other impacts from ecosystem management.

- Roundtable participants generally felt that ecosystem management would produce higher quality recreational experiences, but they were concerned that increases in quality would be achieved only through decreases in the quantity of recreational opportunities available to the public.

- Social and cultural impacts (culture and tradition, social vitality and stability) were seen to decrease in the short term because of the reduction in employment, but Roundtable participants could not reach consensus on long-term impacts because we do not yet understand how the many other factors affecting quality of life will be affected by ecosystem management.

- Roundtable participants generally felt that ecosystem management would have positive impacts on how the Forest Service interacts with individuals or groups outside the Agency (participatory planning and leadership in management).

- National Forest management efficiency would decline in the short term as Agency staff learn the new processes and tools necessary to implement ecosystem management.

- In the long term, ecosystem management would result in an increase in ecosystem health and productivity on public lands in the U.S. However, several Roundtable participants cautioned that we need to analyze the impacts of U.S. forest policy decisions on global ecosystem health, and not just confine our consideration to lands within our borders.

Impacts on the Economy

Roundtable participants agreed that in the short term, employment would decline nationwide as a result of implementing ecosystem management on all National Forests. We could not reach consensus on the impact on employment in the long term. Roundtable participants who felt that ecosystem management would result in an overall reduction in employment based their opinions on the belief that ecosystem management would result in a decline in traditional forest product outputs from National Forest land. They argued that among the goals of ecosystem management are the restoration of rare ecosystems and activities to fill gaps in ecological communities. To achieve these goals, participants felt that it would be necessary to develop new constraints on management activities, which would result in a decline in traditional forest product outputs. Some participants anticipated that an increased emphasis on non-timber resources in response to the ecosystem management initiative would also cause a decline in employment in forest product industries. In addition, those endorsing the position of a long-term decline in employment felt that ecosystem management would result in unemployment not only in the forest product sectors of the economy, but also in sectors related to grazing and mining. They predicted that the loss of raw materials from National Forest land would ripple throughout the economy, causing a loss of jobs in construction and other related industries. The question Roundtable participants couldn't answer was: Will these employment impacts occur only in the short term or are they long-term impacts?

Roundtable participants who argued that ecosystem management could result in higher employment in the long term in some sectors of the economy were unsure whether these increases would offset the decreases discussed above. This uncertainty prevented participants from reaching a consensus on long-term employment impacts. Some of the loss in harvesting jobs on National Forest land would be absorbed by increases in harvesting jobs on private lands. Although employment related to recreation may increase as a result of the Forest Service's ecosystem management initiative, Roundtable participants felt that other factors such as discretionary time, income, population, and immigration were more significant factors. A shift in management philosophy (such as the move from commodity-based management to ecosystem-based management) could result in additional employment for scientists to help provide a scientific rationale for decisions

related to the principles of ecosystem management as well as additional employment for analysts to monitor management activities and ecosystem responses. However, some participants questioned whether society would be willing to pay for increases in scientific investigation and monitoring. There were simply too many unknowns in the long term to allow Roundtable participants to reach consensus.

There was no consensus on the nationwide impact of ecosystem management on economic health in either the short or long term. Those anticipating a decline in economic health felt that impacts in this category are heavily dependent on how communities and investors handle the uncertainty associated with any shift in management by a major land holder such as the Forest Service. In general, investors dislike uncertainty and hesitate to commit to any investment associated with a large degree of uncertainty. Rural communities frequently have difficulties attracting new industry, and any questions about access to and removals from National Forest lands produce greater uncertainty. The question was: What is the relative importance of the uncertainties associated with ecosystem management in comparison to all the other unknowns that can affect investment decisions?

Roundtable participants who felt that there would be no change in economic health nationwide pointed out that although National Forest activities have very significant impacts on their rural neighbors, nationally they represent a relatively small part of the economy. Other participants felt that further impacts on already stressed rural communities would result in impacts of national significance. It was pointed out that forest products are a component in 88 of 92 sectors in the economy. In addition, any activity that results in higher prices for consumer products raises questions of equity: Who gains from and who pays for a change in management on National Forest lands?

The consensus view on economic structure and activity was that there would be a decline in the short term, but again, the long-term impacts are unknown. In discussing potential short-term impacts in this socioeconomic impact category, Roundtable participants voiced many of the same arguments and concerns expressed above—ecosystem management would result in a decline in timber product outputs from National Forests and a corresponding decline in employment, ecosystem management increases uncertainty, thereby decreasing investment in rural communities. Participants agreed that ecosystem management in the long term would not result in any increases in economic structure and activity, but they could not agree whether there would be a decline or no change. Factors entering into discussions of long-term impacts included the difficulties that rural communities have in diversifying their economies and in maintaining the tax base necessary to provide services to attract new residents and increase economic development.

Impacts on Recreation and Aesthetics

Roundtable participants agreed that there would be no change in recreation and aesthetics in the short term, but could not reach consensus on long-term impacts. Roundtable participants generally felt that the quality of the recreational experience would increase under ecosystem management; however, participants could not agree on whether increases in quality would lead to increases in the demand for experiences. In fact, some participants felt that increases in quality could come about only with decreases in quantity of recreational opportunities. Although ecosystem management would likely result in a decline in the opportunities for hunting game species, other nonconsumptive forms of recreation may actually increase. Thus, there was no consensus on the direction of a long-term shift in recreation and aesthetics. Roundtable participants agreed that there would be no change in the short term because it would take longer than 5 years for the changes in quality to become apparent.

Roundtable participants quickly reached a consensus that amenity values would increase in both the short term and long term. Although there was quick consensus on the direction of the shift, there was debate about whether the shift would be significant. Some argued that a reduction in clearcutting would have an immediate impact on amenity values. Others argued that the reality of the experiences wouldn't actually change much in the short term, although the perception may improve. Still others felt that reductions in roads and trails might be viewed as a reduction in amenity values by some.

Social and Cultural Impacts

No consensus was reached about the nation-wide impacts of ecosystem management on the quality of life in either the short term or the long term. Some Roundtable participants argued that the quality of life would decline in rural areas. Generally, this conclusion was reached by those who believe quality of life is heavily influenced by economic variables. They argued that quality of life would decrease because ecosystem management would result in higher unemployment in the forest products sector or higher costs to consumers for forest products. The argument for a decline in the quality of life was also made by those who believe that the implementation of ecosystem management would make rural areas more attractive to urbanites, who would then move into these rural areas in greater numbers, increasing population pressures and decreasing the overall quality of life.

The argument made for ecosystem management resulting in a higher quality of life (especially in the long run) is based on the belief that our current approach to resource management and use is not sustainable and that ecosystem management would result in healthier and more sustainable ecosystems. Participants in this camp maintained that it is possible to sustain some desired level of quality of life only with healthy, sustainable ecosystems. Although they acknowledged the importance of economic factors in quality of life, these Roundtable participants were more likely to stress the importance of non-economic factors in evaluating the quality of life. Their perception was that the Forest Service's ecosystem management initiative would improve or enhance these other non-economic values, and thereby make a significant difference in quality of life.

Roundtable participants felt that in the short term, culture and tradition would decline in response to the Forest Service initiating ecosystem management, but they could not reach agreement on the long-term impacts. Again, the decline in culture and tradition was attributed to disruptions caused in the short term by the loss of jobs in the forest products, mining, and ranching sectors of the economy. Some participants thought there would be long-term benefits to local cultures and traditions because of the increase in amenity values resulting from an ecosystem approach to land management. For communities with strong non-exploitive ties to the natural environment, or communities based on subsistence removals of forest products, such as American Indian communities, ecosystem management could result in forests that more closely resemble forests of the past, thereby reinforcing earlier cultures and traditions. However, for communities dependent on extractive industries, built on a foundation of individual rights and independence from big government, citizens could rebel against what they perceive as additional federal regulations destroying their cultures and traditions.

As with culture and tradition, Roundtable participants agreed that in the short term there would be a decline in social vitality and stability, but there was no consensus on long-term impacts. Again, many participants felt that this impact category was strongly related to economic stability, and the arguments were similar to those presented in the discussions of quality of life.

Impacts on Forest Product Outputs

There was very quick consensus that ecosystem management would reduce timber product outputs in both the short and long term. Roundtable participants were unable to reach any consensus about non-timber product outputs. Some argued that adding constraints and restrictions to any system usually means a decline in outputs. Many participants believe that grazing, mining, mushroom hunting, and Christmas tree harvesting would decline. However, in the final analysis, participants felt it was not possible to reach a consensus on non-timber product outputs when so little information was available about these products and the potential impact of ecosystem management on their production.

Impacts on Management

Under ecosystem management, participatory planning and leadership in management would increase in both the short term and long term. Although Roundtable participants were confident there would be more participatory planning under ecosystem management, they were not as confident there would be more consensus.

Ecosystem management will be a success if it is perceived as legitimate, as a process through which societal values are represented using our best knowledge of how forest ecosystems work. If ecosystem management is a success, then the Forest Service will be perceived as a leader in natural resource management. This shift to ecosystem management is not, however, without risks. Participants perceived these risks as high if ecosystem management is perceived as politically driven and low if it is perceived as scientifically based management.

There was consensus that economic efficiency would decline in the short term because ecosystem management will require new planning tools. With old tools such as FORPLAN falling out of favor, the costs of developing, testing, and modifying these new tools could be substantial. There would also be additional costs in training staff to use the new tools. Some of the questions or issues related to long-term impacts on economic efficiency that concerned Roundtable participants were: Does assessing the economic efficiency of ecosystem management require that we place dollar values on amenity and other noncommodity outputs? Will a decrease in commodity value be offset by a perceived increase in noncommodity values? How do we describe the benefits of preservation and existence value in terms of economics? Do we need to, or are opportunity costs sufficient? Over what period of time would we hope to achieve economic efficiency? Efficiency in terms of what? Because of these and similar issues, Roundtable participants were unable to reach consensus about the long term impact on economic efficiency.

Impacts on Ecosystem Health & Productivity

Participants quickly agreed that ecosystem management would improve ecosystem health and productivity at the national level in the long term. Consensus about the short term could not be achieved—primarily because a number of the participants believed that it would take longer than 5 years (our definition of short term) for any identifiable or measurable improvement in the health of the ecosystem. During discussions, a number of concerns surfaced about possible unintended consequences resulting from ecosystem management. These concerns were largely based on questions about how we can continue to meet demand for forest products when raw materials for these products are declining: Given no change in demand, where will these raw materials come from? Although ecosystem management may result in healthier ecosystems on public lands in the U.S., global ecosystem health could decline. In considering the benefits and costs of a change in management on public lands in the U.S., we need to account for international impacts of these actions. In addition, if timber production shifts from the public to private sector in the U.S., particularly to the non-industrial private sector, would gains in ecosystem health on public lands be offset by declines in ecosystem health on private lands? Finally, could a decline in available forest products trigger a shift to non-renewable or more energy intensive materials?

2.2 Directional Impacts of Management Scenarios for the Wisconsin National Forests

To facilitate discussion of the socioeconomic impacts of ecosystem management on the Chequamegon and Nicolet National Forests, the Roundtable co-chairs requested that the Forest staff develop five forest management scenarios. The first scenario, Scenario A, is based on the current approved forest plans for each Forest. This is the only scenario that the Forests are committed to at this time. Four additional scenarios were developed to represent a range of combinations of emphasized uses and values. All scenarios assume the application of ecological principles in forest management. The impacts from implementation of Scenario A are not discussed because it serves as the baseline condition. The impacts discussed for the four other management scenarios are changes from the conditions in Scenario A.

Although Roundtable participants considered potential impacts at the local, regional, and national level, only the local impacts are shown. We focus on the local level because of the importance placed by Roundtable participants on these potential local impacts and because consensus was difficult to reach in all but a few impact categories at the regional and national levels. At these broader geographic scales, differences in opinions were seldom between an up arrow or a down arrow, but were more commonly due to disagreement about the

magnitude of change necessary to justify an up or down arrow as opposed to a horizontal line (indicating no change). The search for consensus was also hampered by a lack of information on which to base decisions.

What follows are the conclusions and discussion highlights from the Roundtable participants' effort to reach consensus on the directional impacts of the 14 socioeconomic impact categories. Some of the highlights from the discussions include (fig. 2):

- *Perceptions* of a changing wood supply, or other impacts, may be as important, in the short term, as the actual *facts*. In the face of uncertainty, most people are cautious, if not wary, particularly when making investment decisions.

- Except for Scenario D (the maximum wood product output scenario), none of the scenarios were expected to result in an increase in economic conditions. Roundtable participants anticipated that these scenarios would result in lower timber product outputs, causing a decline in employment, at least in the short term.

- Roundtable participants could not reach consensus on long-term recreational impacts of the management scenarios. In most cases, they felt there would be a change in recreational opportunities—for example, from motorized or consumptive recreation to less intensive, nonconsumptive recreation—but did not have enough information to determine if the new recreational opportunities would balance those lost.

- Although Roundtable participants were able to reach some consensus on amenity values, it was an uneasy consensus. Participants thought that the public would perceive a decline in amenity values because they (the public) generally value "neatness" in a forest landscape and the application of ecosystem management would result in "messy" forests.

- In general, the direction of impacts on the quality of life, culture and tradition, or social vitality and stability would follow the direction of impacts on the economy. However, we do not yet understand how the many other factors affecting society would be affected by these or other management scenarios.

- The lack of information on non-timber product outputs was so overwhelming that Roundtable participants could not reach any consensus on impacts from the management scenarios in this category.

- One of the basic tenets of ecosystem management is that people are involved in all phases of forest planning and decisionmaking. Because of this focus on citizen involvement, Roundtable participants generally felt that most of the scenarios had the potential for increased participatory planning. However, Roundtable participants felt that if ecosystem management results in any changes in Forest Service policy that take forest management decisionmaking away from the Forests (in favor of decisions at the regional or national level), it would disenfranchise local publics and adversely affect participatory planning.

- Although Roundtable participants were unable to reach consensus on the impacts of any scenario on leadership in management, participants did feel that the role of the Forest Service as a leader in public land management would be enhanced to the extent that ecosystem management is seen as a successful resource management paradigm.

- For only two scenarios were participants able to reach consensus on impacts on ecosystem health and productivity. The lack of consensus in this category is due to a lack of information and the lack of a common definition of ecosystem health.

Scenario B—The Biological Diversity Scenario

Scenario Description—Scenario B represents the management that would occur on the Forests if all the recommendations from the Roundtable on Biological Diversity were adopted. Vegetation management would include some land specially designed to feature ecosystems that are poorly represented in the

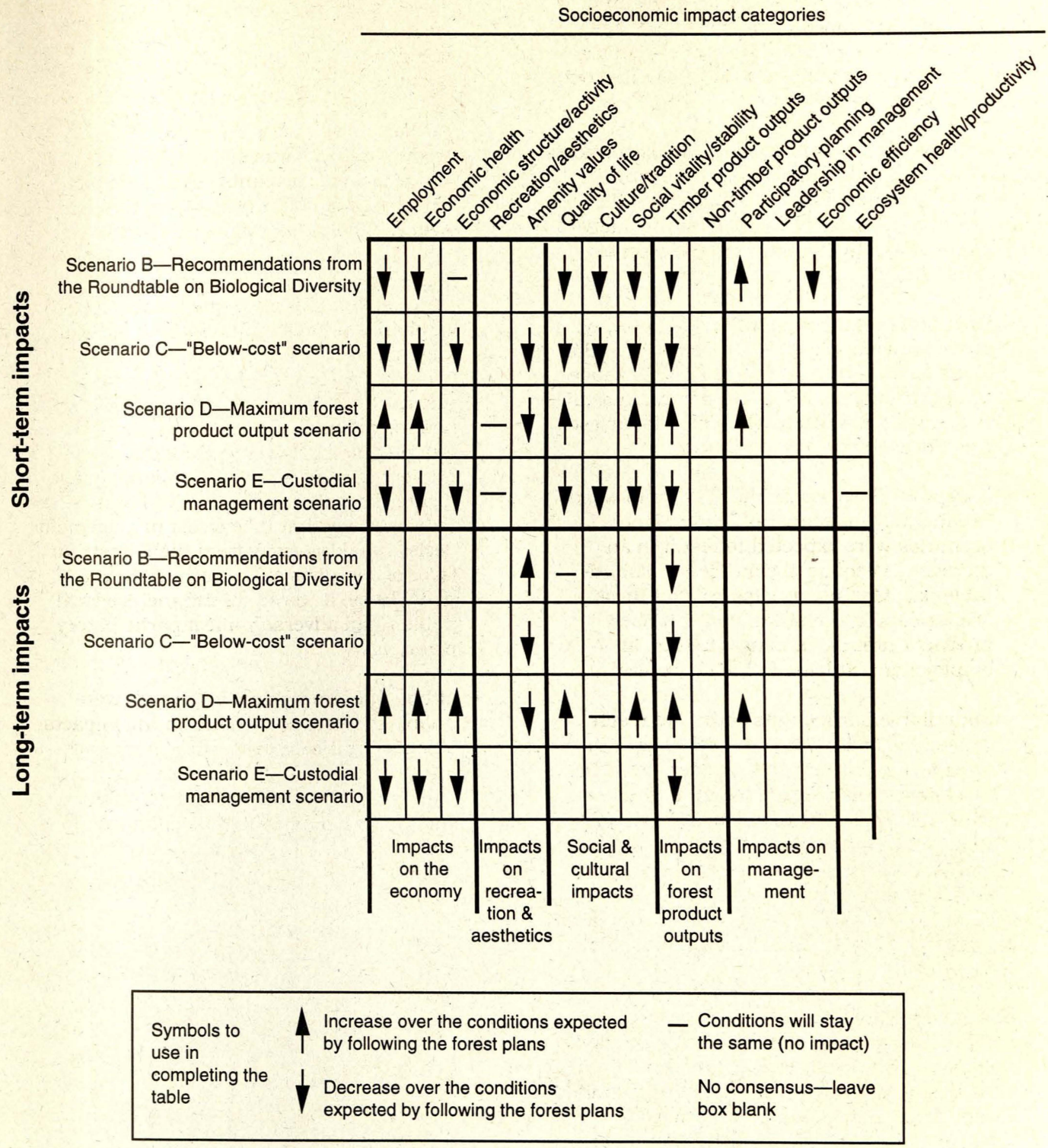

Figure 2.—*Directional socioeconomic impacts of four ecosystem management scenarios on the Wisconsin National Forests, in the short and long term.*

Lake States, such as old-growth forest. Disturbance patterns in those areas would be designed to mimic natural cycles. Some forested lands might be "understocked" while others might be "overstocked" from the viewpoint of optimal timber growth. These lands would provide habitat for plants and animals associated with late-successional ecosystems and those that are intolerant of disturbance. Vegetation management outside the ecosystems described above would emphasize timber growth, yield, and quality, while applying ecosystem principles, protecting the environment, and accommodating other values on a site-specific basis. Co-chairs from the Roundtable on Biological Diversity reviewed the scenario and agreed that it represents the findings of their Roundtable. See Appendix D for details.

Consensus—The Socioeconomic Roundtable's consensus about local directional impacts of implementing Scenario B, the approximation of the Scientific Roundtable on Biological Diversity recommendations, is shown in figure 3. In addition to the consensus shown in figure 3, there was consensus that participatory planning and leadership in management would be up, both short and long term, at the State and regional level. There was also consensus that there would be no change in short-term amenity values at the State and regional level and that there would be no change in the long-term social and cultural impacts at the regional level. The cautions about the meaning of the arrows that were discussed under the national exercise also apply here.

Discussion—Roundtable participants concluded that, in terms of species composition, this scenario would result in fewer acres of aspen and birch and more acres of hardwood climax species and old growth. Participants also felt that it was unlikely that much of the red pine planted by the Civilian Conservation Corps in the 1930's would be replaced following harvest. In the long run, there would be a change in the species mix of pulpwood, with hardwoods becoming dominant. Although this could result in significant negative impacts for mills that currently use aspen and birch, long-term impacts could be mitigated as mills change their species mix. However, during this adjustment period when mills are trying to adapt, there would be some job loss. Some Roundtable participants argued that even if mills could import wood from outside the region, employment would be down in the long run as a result of the local or regional jobs lost in the harvesting sector. Participants could not reach consensus on this point. They did agree that impacts on employment would be variable from one local community to another. This variability makes it difficult to aggregate and generalize impacts on employment.

With respect to new investment in forest products industries in the region, investor perceptions of potential local and regional impacts resulting from management action may be more critical than actual shifts in the species or volumes offered for harvest. The Roundtable participants exhibited general concern about possible instability in the wood supply and its effects on local and regional industries. The perception of an unstable wood supply or increasing regulation often precludes the opportunity to attract new wood products industry. Even if the resulting decline in wood products employment were offset by an increase in employment in other sectors, participants agreed that at least in the short term, the overall economic health of the local area would decline. One reason for the uncertainty about employment and economic health is the as yet unknown potential impacts from the influx of urbanites building seasonal and retirement homes. It was difficult for Roundtable participants to attribute a significant increase in this type of investment activity to Scenario B.

In discussing recreation and aesthetics, several participants felt that Scenario B would result in reductions in recreation related to deer hunting and to motorized recreation. These participants believe that any potential increases in recreation associated with characteristics of the new forest created in Scenario B would not make up for the loss in these two categories of recreation. Participants also noted that the spending patterns associated with less intensive or non-consumptive recreation are different from the patterns seen with traditional game hunting or motorized recreation, thus creating the potential for further declines in local economies. Other participants were convinced that losses in expenditures from recreation in one sector would be made up by increases in other sectors. All participants anticipated an increase in recreation generally, but noted that it would be

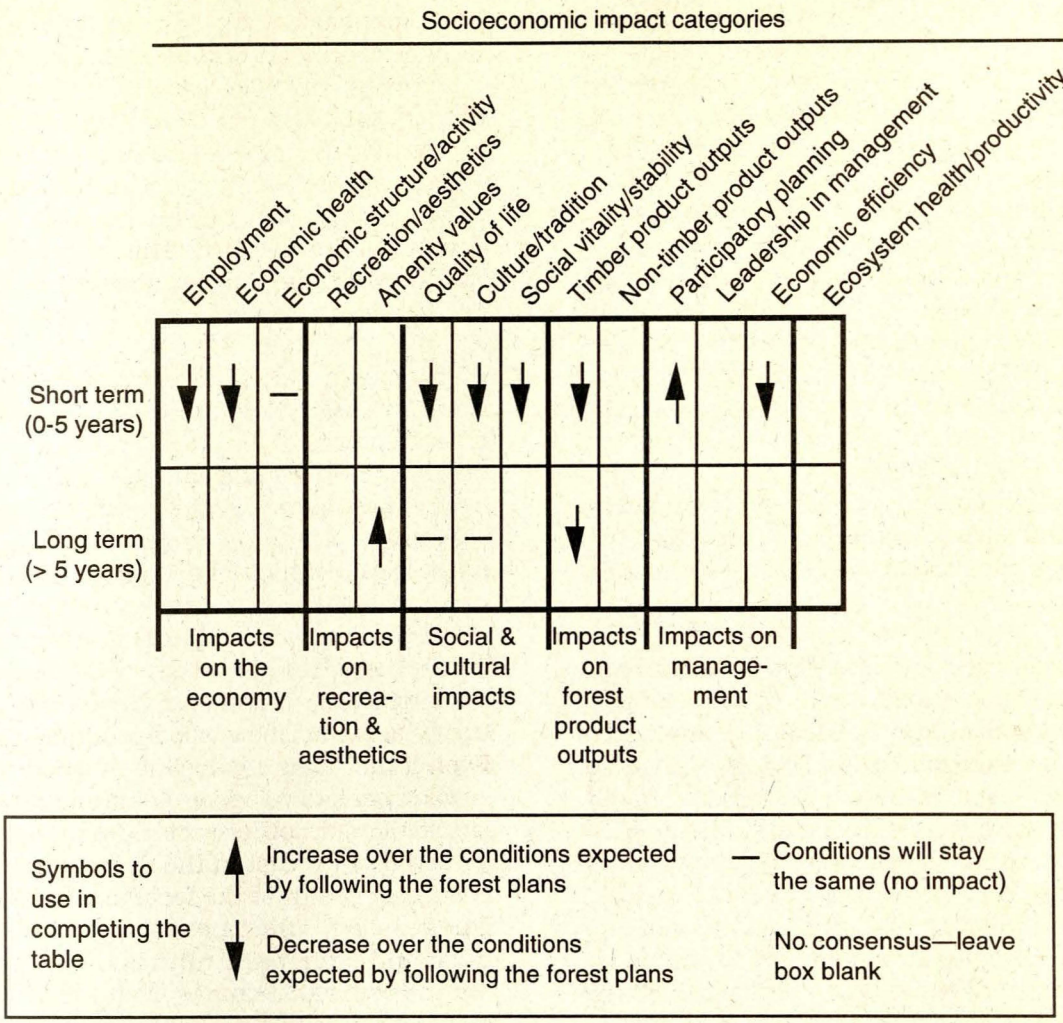

Figure 3.—*Directional socioeconomic impacts of the Wisconsin National Forests following the management outlined in Scenario B—focus on recommendations from the Roundtable on Biological Diversity.*

difficult to separate scenario-related increases from the general trend. Roundtable participants could not reach a consensus in this impact category.

At least in the short term, potential improvements in amenity values will not result from actual changes that can be observed on the ground, but from the perception that something is changing for the better on the Forests. Although the intangible impacts from Scenario B may run their course in a few years, actual physical changes in the resource resulting in increases in amenity values will be evolving and will increase over time. However, it was the general feeling among Roundtable participants that 5 years was just too short a time in which to see actual improvements in amenity values on the ground.

There are significant questions about how changes in forest management practices result in changes in amenity values. Roundtable participants were fairly comfortable discussing visual resources and how changes in forest management practices affect what we see from a road or campground. Participants could agree that at least in the short term, the looks of the Forests under Scenario B might not be those that people have come to value. Scenario B would not produce the picturesque, sublime, pastoral landscapes and "big tree," manicured, park-like appearances that many members of society value. Biodiversity values "messiness," and we may have to help people understand this so they can develop a new aesthetic or concept of beauty that appreciates the "look" of biodiversity.

We must keep in mind that amenity values are more than just values related to the visual resource. Amenity values cover the broad range of nonmonetary values that we are often so uncomfortable talking about. Just because we are beginning to develop "scientifically sanctioned" tools for quantifying visual resources does not mean that all other aspects of amenity values are now ignored. If we just considered the visual resource, Roundtable participants could probably agree that at least in the short term, amenity values would not go down. But because we were considering the broad range of amenity values (for example, spiritual values or a sense of place), we could not reach consensus on the short-term impacts and felt that amenity values were likely to increase in the long term.

Relative to quality of life, culture and tradition, and social vitality and stability, Roundtable participants felt that in the short term, conditions in each of these impact categories would decline because of disruptions in employment and other economic factors. However, because of the wide variability among communities and the variety of factors helping to define social and cultural impacts, it was much more difficult to agree on what would happen in the long run. Participants felt that in general, Native American communities would show positive effects because the vision inherent in Scenario B meshes with what we perceive to be Native American vision and culture. On the other hand, where the quality of life, culture, and social vitality and stability are linked to local logging communities, we are likely to see a decline in conditions in these three impact categories. In addition, some communities are more resilient than others and are better able to respond to changes in the social and physical environment. Generally, inconsistencies among communities in the way in which they respond to change are related to differences in community infrastructure and leadership. In some communities, change brings people closer together and fosters a sense of working together to overcome challenges. In other communities, change brings about a sense of loss of control or of being a victim of forces outside your control and leads to negative attitudes and behaviors.

We need to caution that in evaluating social and cultural impacts, rural and urban populations must be evaluated separately so that the impacts and other concerns of rural populations do not get "washed out" by the larger urban populations. In addition, local populations must be considered separate from regional or national populations.

One of the basic tenets of ecosystem management is that stakeholders are involved in all phases of the forest planning process—including involvement in developing alternatives, evaluating tradeoffs, and making decisions. Because of this focus on citizen involvement, we can anticipate that activities in support of participatory planning would increase for all scenarios. In addition, Scenario B specifies a number of special use areas that would undoubtedly result in additional efforts to increase citizen participation in the planning process. Research in the Boundary Waters Canoe Area showed that with proposals for special use areas, citizen participation increases for a time then tends to level off or gradually decrease. However, if the Forest Service intends to reach "collective goals" by working with other public agencies, adjacent ownerships, and partners, Forest Service personnel will have no choice but to increase efforts to develop and apply models for participatory planning.

Efforts by the Forest Service to implement an ecosystem approach has placed it in a leadership role in public land management. In this role the Agency has found itself under the microscope—being studied and judged as to its successes and failures in accomplishing its mission. If ecosystem management is done well, the Agency may serve as a model that is followed by other public agencies throughout the country. If the Forest Service fails in its attempts to implement an ecosystem approach to land management, the Forest Service image may suffer.

As with many new programs, Scenario B can be expected to be more costly, time consuming, and complicated than continuing to manage the Wisconsin National Forests under their existing forest plans. The extent to which we see a decrease in management efficiency will depend on how quickly Forest Service employees learn what is necessary to implement ecosystem management and the activities called for in Scenario B. In addition, interdisciplinary approaches to management are typically more costly. An increase in the level of monitoring expected under ecosystem management may also be expensive.

Arguments for increased efficiency under Scenario B rest on the assumption that litigation costs are likely to be even higher if ecosystem management issues are ignored. In addition, participants argued that the increased public participation expected under ecosystem management may reduce appeals and lawsuits. Roundtable participants expect positive management efficiencies from the two Wisconsin National Forests working together. Tighter Forest Service budgets may also move the Agency to greater management efficiencies.

With respect to increasing biological diversity, Roundtable participants recognized that progress will come very slowly, and that in some parts of the Forests, harvesting will play a key role in advancing biological diversity. Some participants felt that species richness could possibly decline under Scenario B because maple would dominate the long-rotation hardwoods and because disturbance would be reduced. Others felt that under this scenario, the National Forests would provide biological diversity not available in the rest of the State. There would be a need to work with county and State foresters and planners so that they could coordinate their mix of product offerings.

Scenario C—The Below-Cost Timber Sale Scenario

Scenario Description—At the time we were organizing the Socioeconomic Roundtable, there was much discussion within the Forest Service about eliminating below-cost timber sales on all National Forests. Scenario C was developed to describe how the Forests would be managed if all below-cost timber sales were eliminated. Under this scenario, forest management emphasizes short-term economic efficiency in all programs. Timber management occurs only on those lands where projected revenues would exceed management costs in the short term. The recreation program would emphasize high-intensity and high-density use to benefit the largest number of users per dollar invested. Wildlife habitat enhancement would rely heavily on partnerships with organized groups providing funding. Habitat for threatened, endangered, and sensitive species would be protected, but active management for enhancement would be limited by investment costs. See Appendix D for details.

Consensus—Figure 4 shows the consensus view of the local directional impacts of Scenario C, elimination of "below-cost" timber sales. In addition to the consensus shown in the figure, there was consensus that there would be no significant impact on ecosystem health and productivity at the State and regional level. Roundtable participants agreed that there would be no change in quality of life at the State level but that there would be a decline in long-term amenity values. Also, there was consensus that long-term social and cultural impacts would not change at the regional level.

Discussion—In discussing Scenario C, Roundtable participants clearly expected reductions in timber volume from thinning and selective cuttings, in addition to the projected reductions in total harvest. A reduction in overall total harvest would have a corresponding disproportionate reduction in the harvest of pulpwood in the short term and would result in a decline in the size and quality of the sawtimber removals over a longer period. Considering these factors, participants felt that there would be a decline in timber-related employment and that this scenario would depress investment in forest products industries in northern Wisconsin. Some participants expected a decline in forest industry employment to be offset by an increase in employment in the recreation and tourist industry. However, because recreation jobs are seasonal in nature and generally have lower pay scales, many felt there would not be a sufficient number of these jobs to make up for the decline in forest industry employment. These same participants felt that the economy would be less stable and that there would be a corresponding decline in short-term social and cultural impacts.

With respect to impacts on the recreation and aesthetics categories, Roundtable participants generally accepted the scenario description that stated that all forms of recreation, except non-motorized extensive uses, would increase. However, several participants questioned this assessment, given the decline in open roads and early successional habitat types in this scenario. Questions were raised about dispersed recreation and where these people would go—would recreation within the State merely become more concentrated? In discussing amenity values, most participants assumed that there would be

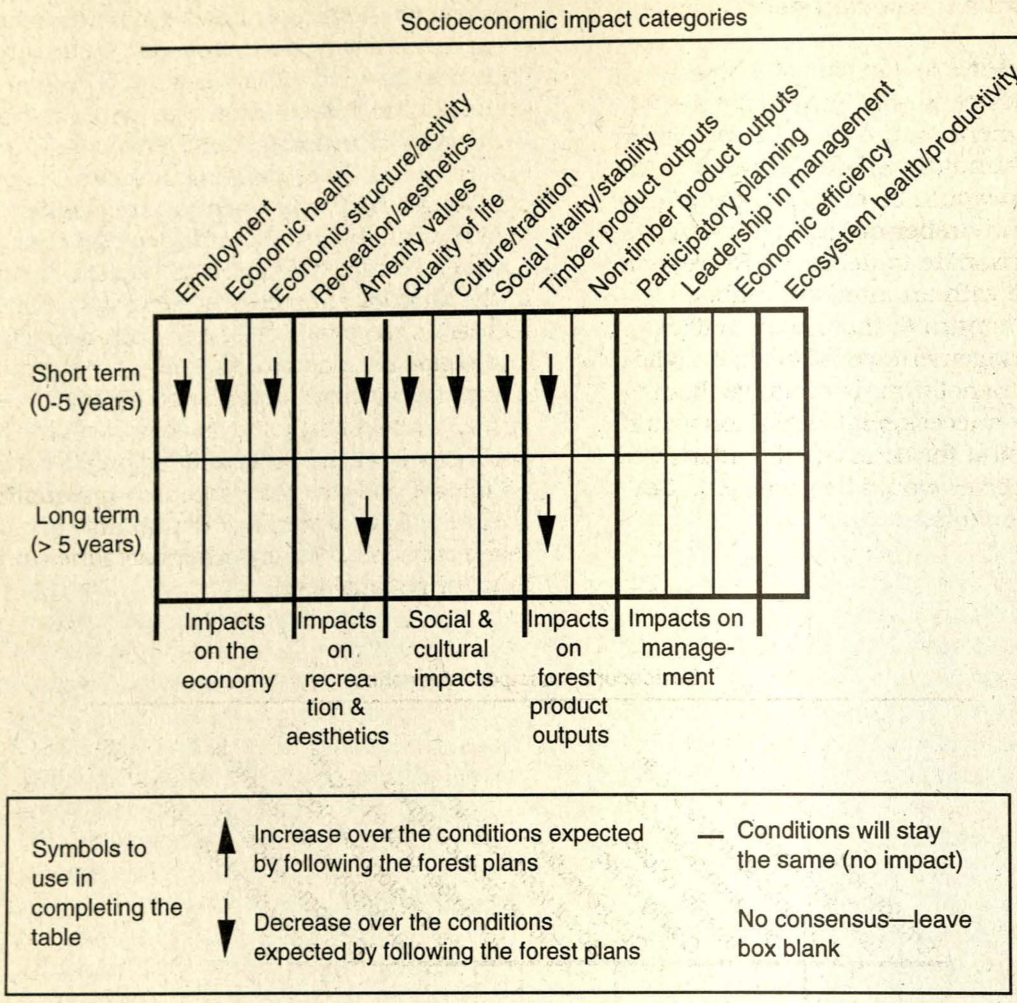

Figure 4.—*Directional socioeconomic impacts of the Wisconsin National Forests following the management outlined in Scenario C—focus on "below-cost" management activities.*

more clearcutting under this scenario and thus that there would be more adverse public reaction to the visual effects of clearcutting.

Many participants anticipated that Scenario C would result in an increase in participatory planning because of the guiding principles of ecosystem management and the need for increased public involvement given the radical change in harvest level and the increased reliance on clearcutting as a harvest prescription. This increased participation would likely bring an increase in court cases. On the other hand, there was some question whether a "top down edict" from the Forest Service's Washington Office would boost or repress participation. Other agencies are not likely to follow suit with similar scenarios because of its short-sightedness and the fact that decisions are based on a somewhat arbitrary accounting system. Some participants felt that this scenario would result in significant management efficiencies associated with implementing "on the ground" forest management, while others believed that the increase in controversy and associated challenges to Forest activities would more than offset these savings.

Many participants were concerned that the reduction in selective thinning and salvage operations would expose the National Forests to increased risks of catastrophic losses associated with insects, disease, and fire and that the long-term health and productivity of the ecosystem would decline. However, we were unable to reach a consensus on this point.

Scenario D—Optimal Wood Product Outputs

Scenario Description—As part of a broad range of possible scenarios, Scenario D describes management on the Forest to maximize production of abundant, affordable wood products. Vegetation would be managed to optimize growth, yield, and timber quality, with a mix of products proportionate to demand. Recreation uses compatible with an intensive timber program would continue; those that conflict with timber management would decline. Wildlife species that benefit from vegetative disturbance and early-successional vegetation would be favored. Habitat for threatened, endangered, and sensitive species would be protected. See Appendix D for details.

Consensus—Figure 5 shows the Roundtable's consensus view of the direction of local impacts related to Scenario D—optimal wood product outputs. In addition, there was consensus at the State and regional level that timber product output in the short and long term and associated long-term employment and economic health would be up. Roundtable participants also agreed there would be no significant impact in the short or long term on State and regional recreation, regional social and cultural factors, and regional economic efficiency. The consensus was that there would be no significant impact in the short term on ecosystem health/productivity at the State and regional level and no impact on economic structure and quality of life at the State level. The Roundtable could not reach consensus in any other categories at the State or regional level.

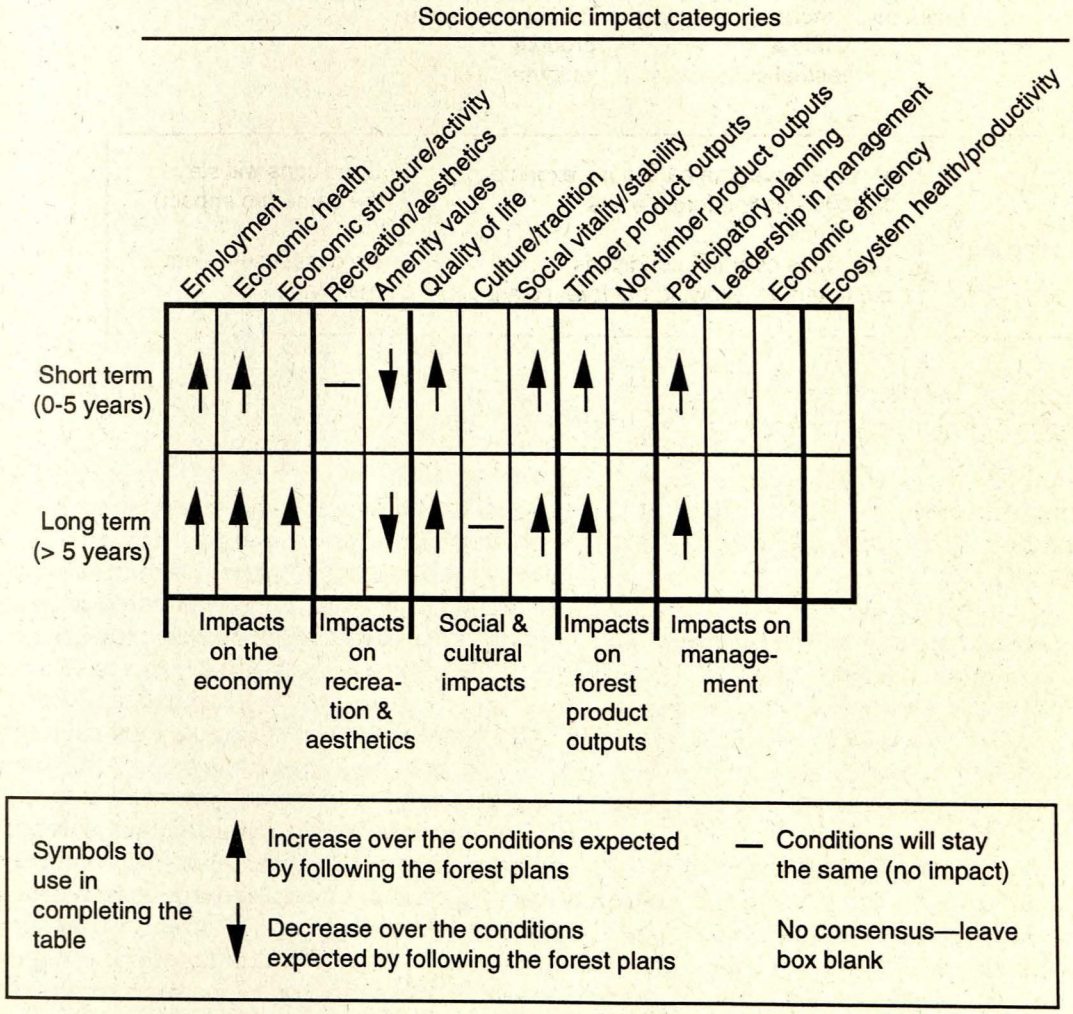

Figure 5.—*Directional socioeconomic impacts of the Wisconsin National Forests following the management outlined in Scenario D—focus on forest product outputs.*

Issue Discussion—The more than 15-percent increase in harvest volume in this scenario is expected to result in a modest increase in employment at the local level. There were differing opinions about whether the increase would be sufficient to cause new capital investment in the local communities. Many participants felt that in the short term, increases would be dealt with through increases in capacity utilization. These same people felt that in the long term, the healthy economies resulting from this scenario and the increased certainty of the wood supply could result in some additional capital investment and some increase in the number of small businesses. Other participants believed that these increases would be quite small and inconsequential. Perceptions of this scenario's impact on quality of life and social vitality and stability were related to the economic factors. Participants could not agree on how other determinants of quality of life and social vitality and stability would be affected by Scenario D.

Although there was general agreement that amenity values, particularly aesthetics, would decline under this scenario, we could not agree on how this reduction in amenity values would impact recreation in the area. Some participants argued that the decline in amenity values would cause a net reduction in recreation. Others countered that while some aesthetics-related recreation would shift to other areas within the region, this shift would be balanced by increases in recreation related to hunting and snowmobiling. There was also some question about where the tradeoff is between aesthetics and other factors in recreational decisionmaking. How much of a decline in aesthetics is necessary before people decide to change their recreational location or behavior? Are aesthetics more important in making recreation decisions than visitor services and other facilities?

Scenario E—Custodial Management

Scenario Description—Scenario E takes a custodial approach to management on the Wisconsin National Forests, with no routine commercial timber management or wildlife habitat manipulation. Vegetation would pass through successional stages, gradually moving toward mature forest, except for localized natural disturbances. Wildlife species associated with early-successional forest would gradually be replaced by species associated with mature forest. Only habitat for threatened, endangered, and sensitive species would be actively managed, if needed, to sustain habitat over time. The recreation program would probably be similar to that found in the current forest plans, except that hunting would gradually decline with the reduction in game populations. See Appendix D for details.

Consensus—Figure 6 shows the Roundtable participants' consensus view of the directional impacts at the local level for Scenario E, the custodial scenario. At the State and regional level, for the short term, there was also consensus that employment, economic health, and economic structure would decline and that there would be no impact on recreation or ecosystem health. Also at the State level, there was consensus that quality of life and timber product outputs would decline in the short term and that economic efficiency would decline in the long term. At the regional level, the Roundtable felt amenity values would be unaffected in the short term and, as at the State level, long-term economic efficiency would decline.

Issue Discussion—As requested by the Roundtable co-chairs, this scenario specified no active vegetation or habitat management. Although technically the Forests may be able to undertake this scenario under the banner of ecosystem management, the Forests could not undertake this scenario given current laws. Although participants found this scenario the most unbelievable of the set of scenarios, they were able to suspend their disbelief and assessed directional impacts of socioeconomic factors.

The total elimination of timber harvest and other vegetation manipulation from Wisconsin's two National Forests was perceived to have major impacts on economic, social, and cultural factors. Downward directional impacts associated with this scenario should be interpreted as much greater in magnitude than those associated with Scenarios B and C. From a regional perspective, a small number of people who are much worse off can be masked by a large number of people being slightly better off, social

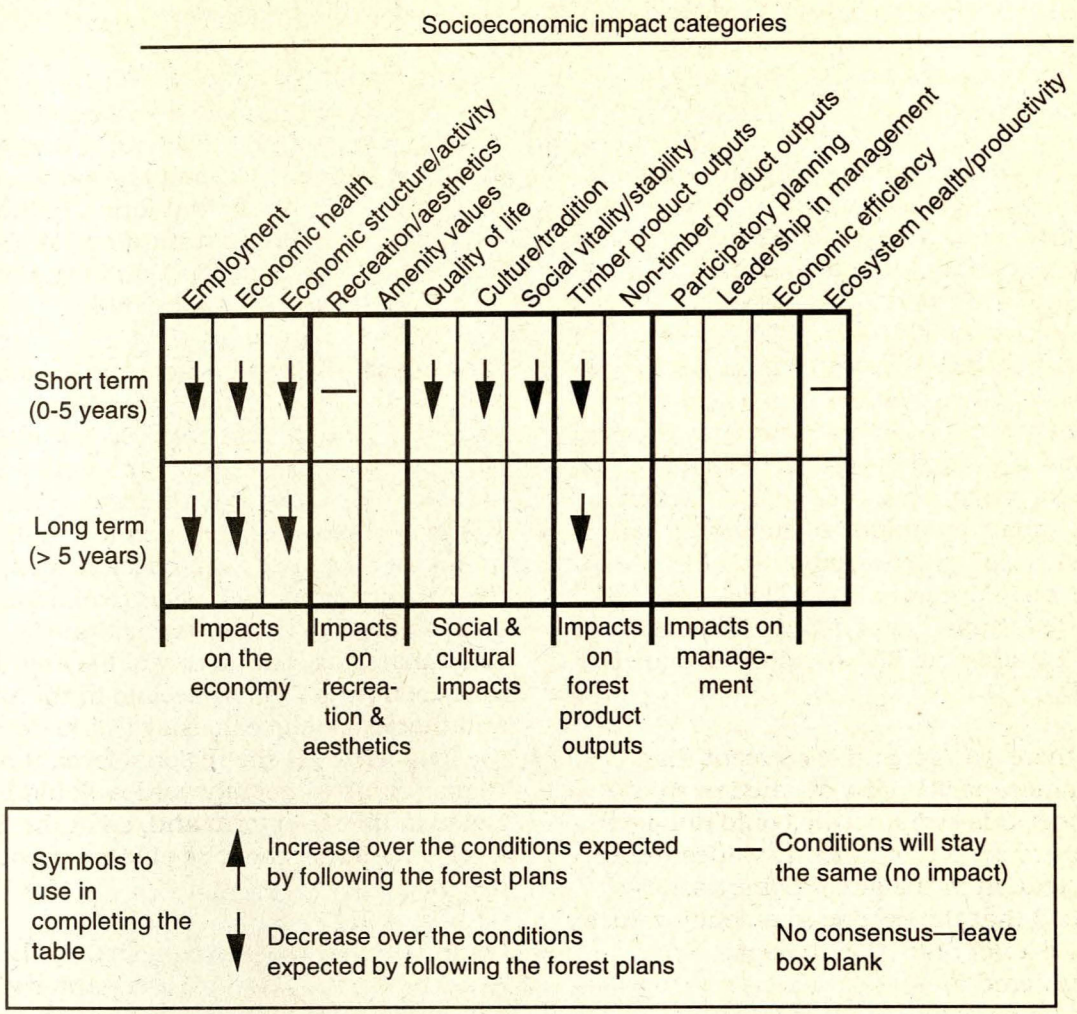

Figure 6.—*Directional socioeconomic impacts of the Wisconsin National Forests following the management outlined in Scenario E—focus on custodial management.*

and cultural impacts are likely to be more local in nature. On the other hand, the sum of the impacts on many local communities could become significant. There could be significant societal costs associated with people refusing to leave a local community and going on welfare. Some participants suggested that Forest Service personnel could play an important leadership role in helping communities adjust to changes. This potential may be dependent on whether Forest Service personnel are perceived as being thrown into the same boat as the community or whether they are perceived as the ones causing the community's problems.

Recreation is assumed to remain consistent with current levels; however, several participants suggested that recreational service/support would likely decline as communities decline and that this could have a negative impact on recreational demand. Several participants indicated that amenity values would increase because the forest would look more natural. Others argued that increases in dead or diseased timber and wind or fire disturbance and decreases in openings and vistas would cause aesthetics to decline in the minds of most of the public.

Participatory planning could increase or decrease depending on a person's perspective. Some believe that after the initial decision to implement, there would be few decisions of significance and therefore little interest in the Forest Service plans. Others believe that this scenario would lead to controversy and therefore increased interest in planning over the long run. In the area of economic efficiency, some believe

the associated decline in Forest Service staffing would constitute increased efficiency, while others feel that declines in the return from the investment in the land base would constitute reduced economic efficiency.

With respect to ecosystem health/productivity, participants again had differing views. Some argued that if nature is allowed to take its course, the ecosystem health will improve. Others felt that fire would never be allowed to go uncontrolled as it did in pre-European settlement conditions, and thus, the forest would move toward an unhealthy state and diversity would decrease.

Chapter 3—TOOLS FOR EVALUATING SOCIOECONOMIC IMPACTS

One goal of the Socioeconomic Roundtable was to provide forest managers and planners with a list of tools appropriate for evaluating impacts in each of the 14 socioeconomic impact categories. There was much disagreement among some Roundtable participants about what is a tool for evaluating impacts and what is a method of collecting data. This disagreement reflected the different disciplinary background of the participants. What follows accepts the broadest definition of tool—something that serves as a means to an end.

Table 1 shows the tools identified as appropriate for evaluating socioeconomic impacts on the Wisconsin National Forests. Best or recommended tools are indicated by an "X"; other tools appropriate for measuring impacts in the category are indicated by a "•." The tools selected as best in any one category are described below in alphabetical order. The completed worksheets for all tools—specifying data requirements, advantages, and disadvantages, and providing a reference—are found in Appendix E.

Participants indicated that several tools are appropriate for measuring impacts in all impact categories while others were appropriate for evaluating impacts in only one or two categories. In addition, several tools were selected as a best tool for more than one impact category. In general, the quantitative tools were applicable to only the one or two categories for which they were developed, while the tools that described qualitative impacts were applicable across a range of impact categories. The participants recommend that given the reality of funding and personnel constraints on both Forests, any analysis of impacts in a category should begin with the tools identified as best. Patton (1980) provides useful descriptions of many of the qualitative tools discussed here, and others that forest managers may want to investigate. Many of the computer-based analytical tools are briefly described in Schuster *et al.* (1993).

In addition to the specific tools discussed below, there were several categories of tools in which rapidly emerging new technology or ongoing research are providing new methods for evaluating socioeconomic impacts. Geographic information systems (GIS) offer exciting new possibilities for displaying biological data, but social scientists have also been investigating how GIS can better illustrate the linkages between social and biological data. With the Forest Service's agencywide move to a new computer system that includes GIS capability, National Forest staff will want to watch for new technology for integrating information on social systems and ecosystems.

Roundtable participants recommended that Forest staff keep up-to-date with research on demand models. Demand models are potentially important tools for assessing impacts in several categories, including recreation and aesthetics. Although some models are currently available, it was generally recognized that we need to better understand how resource or landscape conditions affect the demand for certain types of recreation or affect certain aspects of a recreational experience (such as the aesthetics of the experience). The applicability of demand models for estimating the demand for and value of recreational activities is widely accepted. However, the level of technical skills required to use these models can be high.

Roundtable participants also indicated that the Forest staff should be on the lookout for opportunities to conduct quasi-experiments that could help them understand how their management actions affect resource use and user perceptions. If a management action is planned for an area and a similar area can be identified where the action will not take place, monitoring changes in perceptions and use in the two areas could give some insight and data that could be used to help develop demand functions.

The Roundtable participants noted that there are various evolving simulation models that could provide some insight into the effects of management actions on recreation, tourism, and aesthetics. Although none are currently "on the shelf," it would be important to monitor the development of these models through the Forest

Table 1.—*Tools for evaluating socio-economic impacts*

	Socio-economic impact categories													
	Employment	Economic health	Economic structure/activity	Recreation/tourism	Amenity values	Quality of life	Culture/tradition	Social vitality/stability	Timber product outputs	Non-timber product outputs	Participatory planning	Leadership in management	Economic efficiency	Ecosystem health/ productivity
Behavior-setting analysis^						•	•	•						
Case studies	•	•	•	•	•	X	•	•	•	•	X	X	X	•
Content analysis				•	•	•	•	•	•	•	•	•		
E-Z impact ^	•	•	•	•	•	•	•	•	•	•	•	•	•	•
EDDAPS	•		X											
Ethnographic interviews				•	•	•	•	•	•	•	•			
Expert opinion	X	X	•	•	•	•	•	X	X	X	•	X	•	•
Focus groups		X		X	X	X	X	X		•	X	•	•	
FORPLAN									X					
Global trade model (GTM)	•	•	•						•				•	
IMPLAN	X		X	•										
Interpretive structural modeling ^	•	•	•	•	•	•	•	•	•	•	•	•	•	•
IPASS	•		•	X										
Key informant interviews		•		•	•	X	X	•		X	•	•	•	X
Limits to acceptable change (LAC)				X	•									
Multi-attribute modeling^	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Non-market benefit valuation				•	•	•	•	•	•	X				
Observation				•	•	•	X	•		X	•			
Rapid rural assessment						•	•	•						
Recreation opportunity spectrum (ROS)				X	•									
REMI	X		X	•										
Scenic beauty estimation method (SBE)					X									
Surveys	•	•	•	X	X	•	•	X	•	X	X	•	•	•
System dynamics ^	•	•	•	•	•	•	•	•	•	•	•	•	•	•
TAMM									X					•
Total quality management (TQM)		•		•	•				•		•	X	•	•
Visual monitoring system (VMS)				•	X									
Wisconsin input/output model	•													

Key: • Tool appropriate for measuring impacts in the category.
X Tool recommended as "best" for measuring impacts in the category.
^ Tool added after the roundtable adjourned, was not available for discussion.

Service's Fort Collins Computer Center. Research in the area of risk assessment may also provide forest managers with tools to improve management decisions. Investigations are moving beyond the evaluation of investment risks to determine how risk plays a role in a variety of decisions from planning timber sales to purchasing vacation homes.

Finally, in the past, research related to management efficiency, such as cost accounting and organizational analysis, has been seen as applicable primarily to private industry. However, with the demand for increased accountability in public programs, this literature offers some useful advice related to managing public lands.

The following tools were recommended by Roundtable participants as important for evaluating socioeconomic impacts in specific impact categories. Participants recommend that Forest staff become familiar with these tools or identify people who can help them apply these tools in identifying socioeconomic impacts on National Forest lands.

Case Studies

Case studies are used primarily for *ex post* evaluations of projects or activities. They focus on how the project has succeeded or failed, and what others can learn from the project. Case studies are fairly simple, but effective. The key to conducting case studies and evaluations is to be practical and to focus on the needs of the people for whom the evaluation is being conducted (Patton 1982). The first step must be to define why a case study is being undertaken and to identify the important and relevant questions people need answered. Evaluations must be practical—in terms of time, money, and administration. If the findings of a case study are meant to be generalized to similar projects, it is important that the study focus on questions common to a variety of projects.

EDDAPS

Economic Diversity and Dependency Analysis (EDDAPS) was identified as a best tool for identifying impacts on economic structure and activity (Schuster *et al.* 1993). EDDAPS is closely tied to IMPLAN, using the IMPLAN database and paradox database software to look at the short-term local and regional impacts of management actions on economic diversity. It can also be a useful tool for aggregating counties for IMPLAN analysis. EDDAPS has many of the same limitations as IMPLAN; however, there are published analyses that serve as examples for an application of EDDAPS to a Forest Service region.

Expert Opinion

Expert opinion has proven valuable in a variety of settings to evaluate potential impacts of a policy or program (O'Laughlin and Rule 1990). It was selected as a best tool for evaluating impacts on employment and economic health. The challenge to using expert opinion is in identifying the expert—be that person an academician, public employee, industry analyst, or local resident. The advantage of this approach is that the expert can point you to other experts, creating a network of knowledgeable people that can be tapped for management input. This approach to impact assessment is very convenient—expert opinion can be gathered via a survey, during a phone interview, or in one-on-one conversations. Expert opinion is timely—information can be gathered quickly. Expert opinion is also relevant—with opinions focused on a narrow topic or broad problem. It can focus on short- or long-term impacts at the local or regional level. A disadvantage of expert opinion is that because it is a subjective, qualitative approach to decisionmaking and impact assessment, some see it as less credible than information from a more quantitative tool. In addition, the assessment is the opinion of one individual who was not picked at random but because of his/her expertise in a specific area. The opinion of this one person may not be representative of the discipline as a whole, but consulting a group of experts with different beliefs can help you sense the range of opinions. Finally, a fair amount of thought must go into how the responses of experts will be recorded and made available to others interested in the information. Given the availability of microcomputers and text analysis software, this task can be relatively easy, but some training is required. Other tools that may fall under the heading of expert opinion include review teams or panels, where groups of experts come in to evaluate some aspect of an agency or its activities.

Focus Groups

Focus groups were a recommended tool in a number of categories. Managers can use focus groups to obtain immediate insight into short-term impacts at the local and regional level. The focus group can address a specific issue or cover a range of topics. The process is most successful if facilitated by a person experienced in working with focus groups. Although organizing and conducting a focus group is time consuming and the data obtained cannot be generalized, the process is very flexible and allows for in-depth exploration of themes as they arise. Managers are left with a mass of text or narrative, but the availability of microcomputer software for analyzing narrative data makes the process of sifting through the output and assessing the results relatively easy.

FORPLAN

FORPLAN is a mathematical programming model that supports forest planning. It helps forest managers look at the various mixes of forest management options that will yield a maximum net public benefit as a whole (Hoekstra *et al.* 1986). In a layperson's terms, the model grows the forest; looks at what happens to recreation, water, and other resources when timber is cut; and assigns economic values to each resource (O'Toole 1983). FORPLAN was the basis of the Forest Service's first round of forest planning.

IMPLAN

Impact Analysis for Planning (IMPLAN) is a microcomputer-based system for constructing regional economic accounts, social account matrices, input/output tables, and regional predictive models (Schuster *et al.* 1993). It is useful in evaluating impacts on employment and economic structure and activity. It is most appropriate for measuring short-term local economic impacts. The advantages of IMPLAN are that it's readily available and widely used and accepted. Training and model updates are available. The model considers the entire economy and interdependencies between sectors. The disadvantages of IMPLAN include the fact that it is a static analysis. In addition, the national accounts used by IMPLAN aggregate some sectors of the economy, making it impossible to analyze some sectors that are of primary importance. Users are cautioned to check the reliability of the IMPLAN coefficients for their area of assessment and to make changes as necessary to reflect local conditions.

IPASS

IPASS is an input-output (IO) model used to analyze the direct and indirect effects of alternative National Forest land management policies (Olson *et al.* 1984). It is similar to IMPLAN (discussed above) with the advantage of also being able to do forecasting. Although IO models give a static view of activities, they are convenient for characterizing and analyzing complex local, regional, and national economies. Using comprehensive data on the economic and social situation for the initial year, IPASS can forecast a number of basic socioeconomic indicators (for example, population, employment, earnings, and investment) on an annual basis. Forecasts include statistics on employment, population, earnings, productivity, and output as well as annual rate of change for a large number of variables such as birth rates, and hours worked per week. IPASS is well documented, but it can be very labor intensive and expensive to run. It may require even greater analytical skills than IMPLAN. The fact that users need advanced modeling skills to apply the model may be one reason why IPASS is not as widely used as IMPLAN.

Key Informant Interviews

Key informants serve two primary purposes: to provide information about activities or events that the land manager has not witnessed, and to help explain events that the land manager has witnessed (Patton 1980). They are especially useful in situations where the manager does not or cannot have direct access to a group or activity. People selected to be key informants must be knowledgeable and articulate—people whose insights can help the manager understand what's happening. Key informant interviews are relatively inexpensive and quick. The process sounds deceptively easy, but observing and interpreting what is happening in a cultural setting take perception and insight. As with all qualitative tools, using qualitative data in a decisionmaking framework takes some planning.

Limits to Acceptable Change (LAC)

LAC was developed to evaluate conditions in wilderness areas and to compare those conditions with ones that are judged acceptable. It is a conceptual process that consists of a series of interrelated steps leading to the development of a set of measurable objectives that define desired wilderness conditions (Stankey *et al.* 1985). LAC also identifies the management actions necessary to maintain or achieve those conditions. It is useful for evaluating impacts of changes in management practices on recreation/tourism because it incorporates Recreation Opportunity Spectrum (ROS, see below) in a process that determines how much an area can change before it is no longer appropriate for a given land use. LAC also establishes a set of social, biophysical, and managerial indicators that can be monitored over time. This tool is very data intensive, and important data are often unavailable. In addition, it takes a lot of time to apply LAC to a Forest or other management unit.

Non-Market Benefit Valuation

Non-market benefit valuation refers to a whole set of tools that can be used to estimate the economic value of some output or activity for which there is no direct market. These tools can generally be classified as one of three approaches: contingent valuation (where people are asked to estimate how much an object is worth to them; for example, a willingness to pay approach); travel-cost estimation (where the economic value of some activity is determined by the amount of money spent to take part in the activity); and hedonic pricing (where proxies are used to estimate the economic value of something; for example, the economic value of clean air in a community is estimated by the difference in prices for equivalent housing between those located upwind from a factory versus those located downwind). Winpenny (1991) presents a detailed discussion of non-market valuation methods, and Randall *et al.* (1990) demonstrate how some of these methods could be used to estimate non-market benefits for a National Forest.

Observation

The purpose of observational data is to describe the setting; the activities that took place; the people who participated in the activities; and the meanings of the setting, activities, and participation to those people (Patton 1980). Through observational data, land managers and decisionmakers can come to understand activities and their impacts. Because we believe that we obtain information daily from observation, using observation to evaluate program impacts sounds like a simple approach; however, for an observer to be able to observe events in a manner that is factually accurate, thorough, honest, and credible often takes years of training. Observers need to know what they are looking for and be able to interpret what various behaviors mean. The process is labor intensive and non-replicable. Despite these drawbacks, good information collected from observation allows the manager to truly enter the situation.

Recreation Opportunity Spectrum (ROS)

ROS is a tool for identifying and measuring the consequences of alternative management actions and alternative allocations of land on opportunities for outdoor recreation (Clark and Stankey 1979). It has four specific applications:

1. allocating and planning recreational resources,
2. inventorying recreational resources,
3. estimating the consequences of management decisions on recreational opportunities, and
4. matching experiences recreationists desire with available opportunities.

ROS focuses on the settings in which recreational experiences occur. Settings are defined by six management factors: access, non-recreational resource uses, on-site management, social interaction, acceptability of visitor impacts, and acceptable regimentation. Data requirements—related to managerial, biological, and social factors—can be a major disadvantage of ROS. The time required for analyzing alternative management scenarios can also be a disadvantage. ROS is widely accepted and distributed, with a fair number of people already trained in its use. Scientists acknowledge that research is still needed to validate many of the assumptions underlying the ROS framework (Driver *et al.* 1987).

REMI

The Regional Economic Model (REMI) is an input-output model with many of the same advantages and disadvantages as IMPLAN (Treyz 1993). Like IMPLAN, it was identified as a best tool for evaluating impacts on employment and economic structure and activity. A major difference between REMI and IMPLAN is that REMI includes simulation linkages to make it dynamic; IMPLAN does not have these linkages. The REMI model is not available on microcomputer.

Scenic Beauty Estimation Method (SBE)

The Scenic Beauty Estimation (SBE) Method is a system for quantitatively indexing the aesthetic quality of landscapes (Daniel and Schroeder 1979). This index is developed using human observers' perceptions and judgments of the aesthetic qualities of a landscape. The model is a useful tool for quantitatively predicting the perceived scenic consequences of alternative forest management actions. SBE is recognized by the scientific community as a useful tool to measure impacts of management activities on aesthetics, but it has not yet been widely adopted at the field level.

Surveys

Surveys are a flexible tool for evaluating a variety of impacts. The strength of a survey is its known representativeness. A well-designed survey distributed to a scientifically selected random sample of the population can obtain an accurate representation of the views of all types of people on a variety of matters and concerns. Surveys can focus on a narrow topic of interest or be broadened to solicit attitudes, beliefs, behavior, and attributes across a range of issues. Contrary to popular opinion, the construction of a survey instrument that measures what the user wants to have measured can be very difficult and time consuming. Various methods are available to conduct surveys, but regardless of the type of survey selected, it is essential that good survey procedures are followed. Dillman (1978) has long been the standard for survey design and implementation. Disadvantages related to costs and the amount of time needed to conduct a survey can be controlled to a certain extent by the length and type of survey conducted. An added dimension of surveys is that they can serve as an educational tool as well as a means of gathering information.

Timber Assessment Market Model (TAMM)

TAMM was developed by the USDA Forest Service for projecting future supply and demand of stumpage, lumber, and plywood from the Nation's forests. Using projections of price, consumption, and production trends, the model has been used to evaluate the effect of alternative government policies on key variables (Tedder 1983).

Total Quality Management (TQM)

TQM is an organizational philosophy and commitment to achieve customer satisfaction by meeting or exceeding the needs and expectations of customers (Kaufman 1991). TQM instructs managers and employees to (1) deliver services that better identify and meet customer needs and expectations, (2) better focus organization efforts on program outcomes to achieve public policy objectives, and (3) "do more with less."

Visual Management System (VMS)

VMS is a tool that has been widely adopted both inside and outside the Forest Service to manage visual resources. Specifically, VMS helps managers establish (1) criteria for the identification and classification of scenic quality and (2) recommended visual quality objectives for the acceptable alteration of the visual resource (USDA Forest Service 1974). One product of VMS is an inventory of management areas ranked according to how visually sensitive they are. Areas where management activities would result in major changes in a view shed would be identified as "sensitive," whereas areas where management would not produce great changes in the view shed would be classified as "less visually sensitive" (USDA Forest Service 1988).

Chapter 4.—DATA FOR EVALUATING SOCIOECONOMIC IMPACTS

One of the first questions that arises during an impact analysis or program evaluation is: What data are available? One of the objectives of the Socioeconomic Roundtable was to give the Wisconsin National Forest staff an idea of the sources of data currently available that would be useful for evaluating socioeconomic impacts. The list of data sources in table 2 does not begin to exhaust the possibilities, but gives analysts a place to start.

Staff from the Chequamegon and Nicolet National Forests need to begin to develop an information base to use in planning and decisionmaking. The sources of data identified on the following pages, while limited primarily to data on economic, recreation, and timber product output impacts, are good places to start. Obviously, other data are available for these and other impact categories. Also, analysts must avoid the "data trap"—the belief that only values that can be quantified are applicable to forest decisionmaking. To recognize a range of values, an information data base would need to include the perceptions and other non-quantifiable values of people who use or treasure the forests.

Table 2.—*Sources of data for evaluating socioeconomic impacts*

	Socioeconomic impact categories													
	Employment	Economic health	Economic structure/activity	Recreation/tourism	Amenity values	Quality of life	Culture/tradition	Social vitality/stability	Timber product outputs	Non-timber product outputs	Participatory planning	Leadership in management	Economic efficiency	Ecosystem health/ productivity
Audubon Society bird surveys										•				
Dun and Brad Street, sales, employment and other business data	•													
Federal Reserve Bank	•													
Forward Wisconsin, taxation economic health, and education labor pool		•												
Producers' associations									•	•				
REMI data base		•	•											
Sports and conservation clubs				•	•									
Timber Mart North									•					
U.S. Bureau of Labor Statistics		•												
U.S. Department of Commerce, Bureau of Economic Analysis	•													
U.S. Department of Commerce, County Business Patterns				•										
U.S. Department of Commerce, Economic and Statistical Administration	•													
USDA Forest Service CUSTOMER (SE)				•	•									
USDA Forest Service economic dependency indices (INT)			•											
USDA Forest Service FIA data (NC)									•					
USDA Forest Service IMPLAN database (FC)	•													
USDA Forest Service national forest budget documents													•	

FC Contact the Land Management Planning Systems staff, USDA Forest Service, Ft. Collins, Colorado
INT Contact Erv Schuster at the Intermountain Research Station, Boise, Idaho.
NC Contact Neal Kingsley at the North Central Forest Experiment Station, St. Paul, Minnesota
SE Contact Ken Cordell, Southeast Forest Experiment Station, Athens, Georgia

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	Socioeconomic impact categories													
	Employment	Economic health	Economic structure/activity	Recreation/tourism	Amenity values	Quality of life	Culture/tradition	Social vitality/stability	Timber product outputs	Non-timber product outputs	Participatory planning	Leadership in management	Economic efficiency	Ecosystem health/ productivity
USDA Forest Service National Forest public involvement documents											•			
USDA Forest Service Policy Analysis staff											•			
USDA Forest Service Public Area Recreation Visitor Study (PARVS) (SE)				•	•									
USDA Forest Service RPA staff				•										
USDA Forest Service TAMM data base									•					
USDA Forest Service timber prices data									•					
USDA Forest Service TSPIRS data									•					
U.S. Office of Management and Budget													•	
University of Wisconsin-Madison, demand and supply of Lake States timber outputs									•					
Wisconsin Department of Development		•												
Wisconsin Department of Employment and Human Resources	•													
Wisconsin Department of Natural Resources State Comprehensive Outdoor Recreation Plan (SCORP)				•	•									
Wisconsin Department of Natural Resources, licenses data										•				

FC Contact the Land Management Planning Systems staff, USDA Forest Service, Ft. Collins, Colorado
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Given all there is to do to implement the Agency's ecosystem management initiative, where should the Forest Service start in developing new policies to promote implementation of the initiative and in evaluating possible impacts of the initiative? Roundtable participants voted to indicate the relative importance of the socioeconomic impact categories in assessing forest management decisions at the Forest level and at the Agency level. Figure 7 indicates the most important impact categories for the Forests to consider, while figure 8 indicates the most important impact categories for the Agency to consider.

When we asked Roundtable participants to rank the importance of impact categories for consideration by a National Forest, we asked them to spread their votes not just among the 14 socioeconomic impact categories, but among the 14 categories at two time scales—short term (less than 5 years) and long term, and at three geographic scales—local, State, and multi-State region. For the most part, participants felt that it was most important for a National Forest to consider impacts at the local level. The 10 input categories receiving the most votes for relative importance focused on impacts at the local level (fig. 7).

Roundtable participants thought that it was most important for the Agency to look at the potential short-term impacts of ecosystem management on employment. This vote reflects what we've discussed above in terms of participants' concerns that ecosystem management would result in a decline in timber product outputs and a corresponding decline in employment. However, they felt nearly as strongly about the need for the Agency to analyze potential long-term impacts on ecosystem health and productivity. Roundtable participants rated short-term economic structure and long-term non-timber product output as next in importance for focusing Agency efforts to evaluate national impacts of ecosystem management.

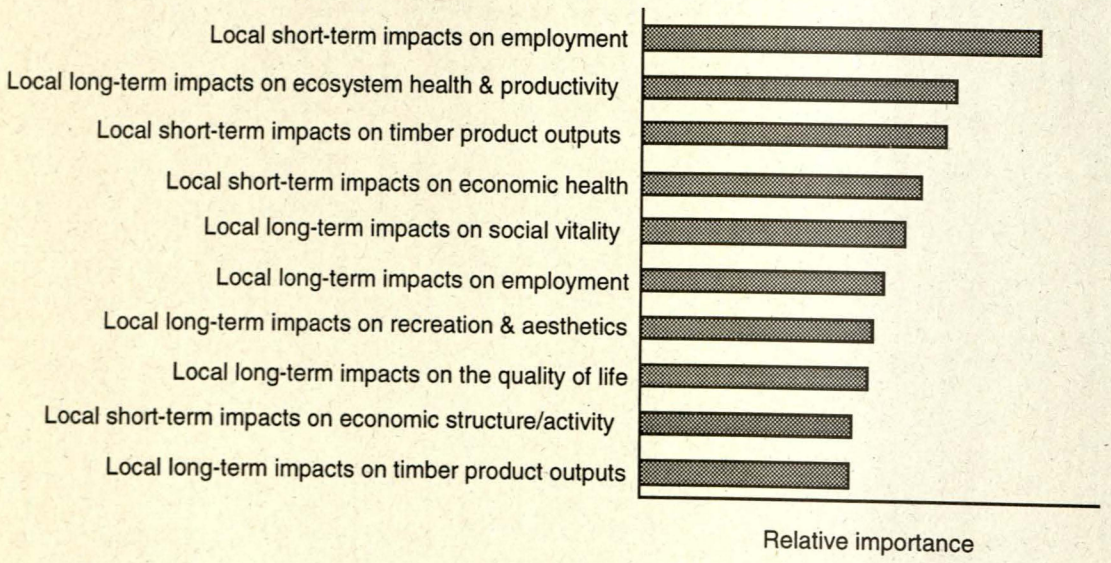
Local short-term impacts on employment
Local long-term impacts on ecosystem health & productivity
Local short-term impacts on timber product outputs
Local short-term impacts on economic health
Local long-term impacts on social vitality
Local long-term impacts on employment
Local long-term impacts on recreation & aesthetics
Local long-term impacts on the quality of life
Local short-term impacts on economic structure/activity
Local long-term impacts on timber product outputs
Relative importance

Figure 7.—*Relative importance of impact categories from the perspective of a National Forest.*

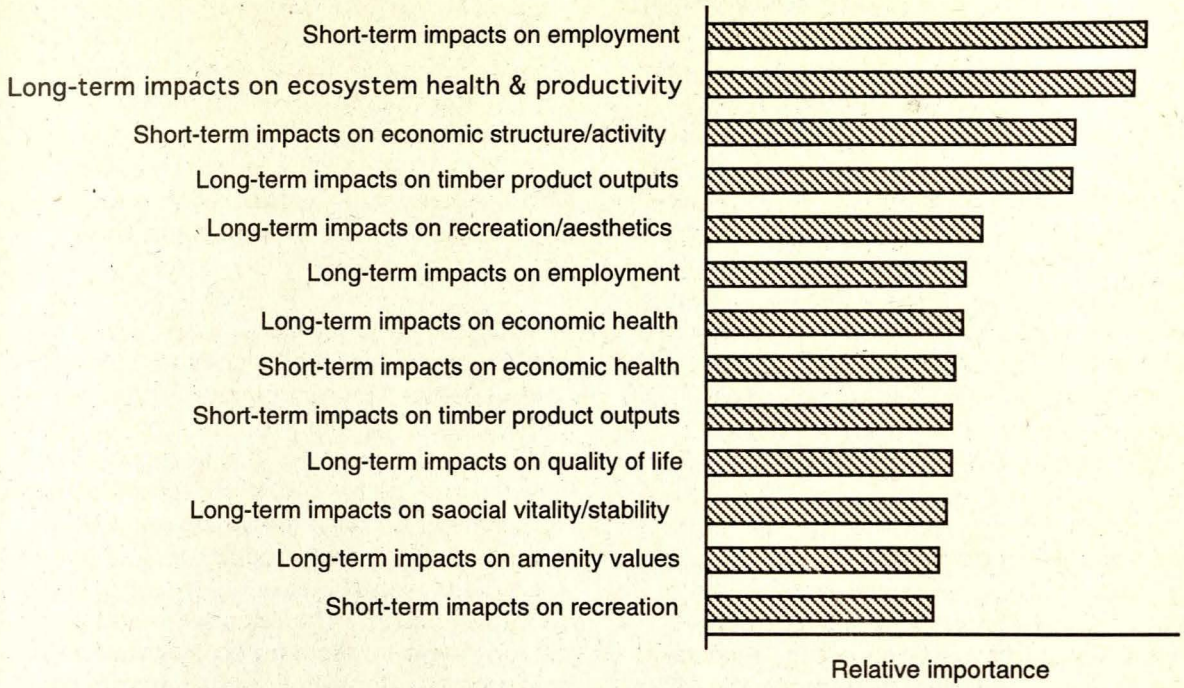
Short-term impacts on employment
Long-term impacts on ecosystem health & productivity
Short-term impacts on economic structure/activity
Long-term impacts on timber product outputs
Long-term impacts on recreation/aesthetics
Long-term impacts on employment
Long-term impacts on economic health
Short-term impacts on economic health
Short-term impacts on timber product outputs
Long-term impacts on quality of life
Long-term impacts on saocial vitality/stability
Long-term impacts on amenity values
Short-term imapcts on recreation
Relative importance

Figure 8.—*Relative importance of impact categories from the perspective of the Forest Service as an agency.*

1. **The Wisconsin National Forests should adopt a philosophy that places equal emphasis on social, economic, biological, and physical impacts when formulating and evaluating resource management decisions.**

   It became apparent during the Socioeconomic Roundtable that there is an imbalance between the biological analysis and socioeconomic analysis being conducted by the Forest staff. In fact, during one point in the Roundtable, participants commented that if the Forests knew half as much about the people who use the Forest as they do about the white-tailed deer, eagles, and red pine living in the forest, they would have made a good start in evaluating socioeconomic impacts. One of the major premises of ecosystem management is that people are an integral part of all ecosystems and that the human dimensions of ecosystem management are as important as the biological and physical dimensions. However, to demonstrate this philosophy and bring balance to their decisionmaking, it will be necessary for the Wisconsin National Forests to implement the recommendations that follow.

2. **The Wisconsin National Forests should reassign responsibilities or hire additional staff to provide the analytical skills necessary for evaluating social and economic impacts.**

   Although the Forests currently have staff that have been trained in several of the social science disciplines, these staff are not currently responsible for providing the analytical information needed to assess social and economic impacts.

   a. As a first priority, the Forests should *hire an economist* with the skills necessary to evaluate the impacts of forest management decisions on timber product output, employment, recreation and tourism, and other economic factors.

   b. As a second priority, the Forests should *hire a rural sociologist* with strong skills in statistics and survey design, so that person can provide information on the other, non-economic social impacts resulting from resource management decisions.

   c. As a third priority, the Forest should *provide training for staff* that helps them understand what questions social and economic analyses can and cannot answer, and how to use information obtained from surveys and other social science analytical tools.

3. **The Wisconsin National Forests should begin immediately to assess the magnitude of the social and economic impacts resulting from their management decisions.**

   a. The Forests should *establish a strategic information base* to serve as a benchmark for evaluating the social and economic impacts of resource management decisions.

      As a first step in building a strategic information base, the Forests should consider some of the data sources identified by the Roundtable participants. However, information useful in decisionmaking is not limited to quantifiable variables, but includes the perceptions and values of people living near or using the Forests. Forest staff should take every opportunity to develop networks of local public officials, business owners, and citizens, who can serve as experts or key informants in evaluating socioeconomic impacts. One item noted during Roundtable discussions is that Forest staff often receive valuable input from citizens with whom they visit during the course of their day, but that this information is often lost because there is no way to record or share the information with others. The Forests should develop a short, simple form that can be carried in vehicles, so that when these exchanges take place, valuable information can be recorded and kept in the information base.

In addition, when the Forests are identifying their GIS needs and implementing their GIS, they should ensure that information on social and economic factors is included in the system. The ability of GIS to display social and economic information along with biological and physical information makes it a powerful tool for impact analysis.

b. The Wisconsin National Forests should begin to test and evaluate a framework (such as the one used in the Roundtable deliberations) for *quantifying and describing socioeconomic impacts.*

Scenario B, the recommendations of the Roundtable on Biological Diversity, offers the Forests an opportunity to evaluate socioeconomic impacts of a management scenario that has received some review and acceptance. Analysts should begin their analysis with one of the critical impact categories identified in figure 7, using one of the recommended tools shown in table 2. After testing and evaluation, the framework and process should be modified and documented for use in forest planning and decisionmaking.

4. In the next round of forest planning, the Forest Service must increase its emphasis on social and economic impacts. The Wisconsin National Forests should serve as a laboratory for testing planning methods and tools.

a. The Wisconsin National Forests should *follow their roundtable process through to its conclusion.*

The Forests should consider using a third roundtable as a forum for involving the public in identifying forest plan alternatives, or alternative desired future conditions (DFC) for the Forests. The Forests should evaluate the success of this approach and make any recommendations available to other National Forests.

b. The Forests should use the process they develop in Recommendation 3b to evaluate the social and economic impacts of the alternative DFC's developed during the third roundtable.

5. The Wisconsin National Forests should cooperate in and support research to enhance the socioeconomic analysis being conducted on the Forests.

Discussions during the Socioeconomic Roundtable made apparent how little we know about potential social and economic impacts resulting from resource management decisions. Research addressing the links between the social system and ecosystems has been identified as a priority research area in a number of research documents (see, for example, National Research Council 1990). Researchable questions raised during the Socioeconomic Roundtable include:

What would be the impact on traditional forest product outputs of changing our land management focus from sustained yield to sustainable ecosystems?

How would this impact be reflected in the health of local communities in terms of jobs? Income? Demographic trends? Crime? Family stability?

Who would be the "gainers" and who would be the "losers" in such a switch in management paradigms? Locally? Regionally? Nationally? Internationally?

How can we communicate to private landowners the value and contribution of their holdings to the health and integrity of the entire ecosystem?

What are the responsibilities of various stakeholders in defining and implementing ecosystem management?

What incentives can we provide landowners to encourage active cooperation in ecosystem management? What disincentives currently exist that discourage such cooperation?

How can we increase the level and quality of involvement by stakeholders in forest planning and decisionmaking?

How can we establish legitimacy (social and political acceptability) for ecosystem management?

How do changes in forest conditions affect our perceptions of the benefits derived from forests?

What is the nature of forest values? What indicators can be used to validly and reliably measure forest values?

What policy-relevant factors explain differences in forest value systems?

What do changing forest values imply for ecosystem management?

The priority the Forests assign to these research questions will be based on needs identified during the development of the strategic information base (Recommendation 3a), the priorities identified by Roundtable participants (fig. 7), and information required for the next round of forest planning (Recommendation 4).

Chapter 7—REFLECTIONS

The assignment of the Socioeconomic Roundtable was to evaluate and recommend tools and data for evaluating the social and economic impacts of ecosystem management, and to evaluate the potential socioeconomic impacts of implementing ecosystem management on the Wisconsin National Forests. How well did we do? Roundtable participants were able to recommend tools and data, and reach consensus on a number of socioeconomic impact categories.

In the past, when we've talked about the impacts of our resource management actions on society, we've focused on timber outputs. Many of our discussions during the Roundtable emphasized the broader economic aspects of forest management decisionmaking. Half of our 14 impact categories clearly reflect the economic value of forests—employment, economic health, economic structure, recreation, timber product outputs, non-timber product outputs, and economic efficiency. Other categories have economic components to them—such as quality of life and community stability.

Although many of our impact categories focused on the economy, we did identify tools, data, and directional impacts that address other functions of society. In addition to economic functions, society must develop both goals and courses of action to attain these goals—what is referred to as polity. Participatory planning and leadership in management were two impact categories through which Roundtable participants attempted to evaluate impacts related to polity.

For society to function with integrity, its members must interact with one another in stable patterns that reflect the interests of the broader society. This function of social integration is called community. We considered the community aspect of society during the Socioeconomic Roundtable when we discussed quality of life, culture/tradition, social vitality/stability, and participatory planning.

Finally, in society we use symbols to create common meaning that can be shared. This dimension of society is referred to as culture, the dimension of society through which we make sense of our existence. Obviously our culture/tradition impact category tries to cover this dimension of society, but other categories also contribute, such as participatory planning, leadership in management, and amenity values.

The premise of the Socioeconomic Roundtable was that resource management decisions can affect people in a variety of ways. For example, a forest manager decides to offer a forest stand for harvest. The logger purchasing the right to harvest the stand is engaged in an economic activity. However, suppose this logger represents a family logging business, and participation in the business continues a tradition that enhances the solidarity of the family (the community dimension). Perhaps the individual also sees this activity as an expression of his or her independence or as a symbol of a constitutional right to "life, liberty and the pursuit of happiness" (cultural dimension). And finally, the person buys the right to harvest the trees from a public agency whose views on resource management coincide with his or her own (the polity dimension). From this example we can see one of the main lessons of the Socioeconomic Roundtable—that forest managers must take a pluralistic view of the impacts of their decisions on society by looking at the impacts on the economy, on polity, on community, and on culture.

Not surprisingly, very few, if any, of us (even within the social science community) can step back and see a forest management decision from all four functions of society. We wouldn't expect a fisheries biologist to speak to the range of impacts a management action may have on the fauna of a forest; likewise, we can not expect one individual to speak to the range of impacts a management action may have on the people working in, living near, and valuing the forest. Just as we need multidisciplinary teams of resource specialists to develop a balanced forest plan, we need multidisciplinary teams of social scientists to fully participate in the effort.

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Appendix A—
ROUNDTABLE ORGANIZATION

The Socioeconomic Roundtable was organized to produce:

1. Recommendations about the use of available analytical procedures for analyzing socioeconomic impacts, and the need for new or additional procedures.

2. Recommendations about data that are currently available to the Forests that should be used to establish baseline conditions for further socioeconomic impact analysis.

3. Estimates of the potential directional effects on socioeconomic variables from the implementation of different ecosystem management scenarios.

Before working on these products, we wanted people to understand the Forest Service's thinking (at that time) about ecosystem management and about socioeconomic impacts (referred to within the Agency as the human dimensions of ecosystem management). To achieve these two objectives, we asked two speakers to kick off the Roundtable by covering those topics.

For the remainder of the exercises, we worked in small groups, reported findings back to all Roundtable participants (the "large group"), and where appropriate, we tried to reach large-group consensus on decisions made within the small groups. We had five major exercises over the four days of the Roundtable. The exercises and process used for each are described below. The findings are reported for each exercise in the main body of the report.

The National Exercise

The first exercise was the national exercise. We had three objectives in having participants start with this exercise. The first objective was to acquaint participants with the socioeconomic impact categories they had helped identify. Second, we wanted to familiarize participants with the process we'd be using later to identify directional impacts of different Wisconsin management scenarios. Finally, we wanted to start the Roundtable with something that would be challenging, controversial, and fun, and that might be of interest in national policymaking circles. For this exercise we created mixed groups, made up of participants with different academic or research backgrounds and different perspectives (local, regional, and national) (see Appendix B for the make-up of the small groups). Given what they had heard about ecosystem management and the human dimensions of ecosystem management, we asked them to indicate their perceptions of potential national socioeconomic impacts if the Forest Service applies the principles of ecosystem management on all National Forest lands. The goal was to have the mixed groups reach consensus on directional impacts wherever possible. We had them look at impacts in both the short and the long term. We did not ask for quantitative estimates of impacts, but for an indication of the direction of the impacts. For example, we did not ask for the number of jobs gained or lost due to the implementation of ecosystem management on all National Forest lands, but for an arrow indicating whether participants felt that jobs would increase, decrease, or stay about the same. The baseline for comparison was the late 1970's and early 1980's. In the large group, we compared the responses of the small groups, and where possible, reached a consensus on directional impacts.

Identifying Tools

The purpose of this second exercise was to identify tools that are currently available to evaluate socioeconomic impacts. Before participants went off into small groups to do this task, Paul Monson from the Forest Service's Eastern Region told them about the tools and data currently used on the National Forests in the Region.

Working in small groups with people of like academic or research interests (referred to as subject groups), participants identified tools for measuring impacts in socioeconomic impact categories related to their interests. Small groups were asked to begin identifying tools in assigned impact categories, to more efficiently use their time and to help ensure that the

people most familiar with an impact category were making recommendations for that category. After completing the task for their assigned categories, they were free to move on to other categories for which they were comfortable making recommendations.

Tools identified in small groups were shared with the large group. New tools were discussed for each category, and added to the list where appropriate.

Armed with the expanded list of tools from the large group, participants returned to their small groups and identified the three or four best tools for identifying impacts in a category. A tool was judged "best" based on its availability, ease of use, level of acceptance, and other variables. These best tools were again shared with the large group, and in some cases new or additional best tools were identified. The large group then reached consensus on the three to five best tools for managers to use in evaluating socioeconomic impacts of forest management actions.

Identifying Data

For this next exercise, participants were asked to return to their subject groups to identify existing data that National Forests could use to establish baseline conditions against which changes in social and economic impacts could be measured. The process of working in small groups and reconvening in large groups to reach consensus on best data was similar to the process described above for tools.

Impacts of Management Scenarios

In this exercise, participants worked in small groups to identify potential local, regional, or national impacts of the Chequamegon and Nicolet National Forests applying the principles of ecosystem management to accomplish the management scenarios described in Appendix D. For this exercise, the participants worked in small groups made up of people who would have the best knowledge of impacts on the local, regional, or national levels (the scale groups). They were to identify impacts resulting from the Wisconsin National Forests pursuing the four hypothetical management scenarios described above in each of the 14 socioeconomic impact categories at the scale participants were assigned. Small group participants were asked to reach consensus on the impacts wherever possible. Small groups shared their consensus with the large group, where we attempted to reach consensus on directional impacts.

Where to Start

The Forest Service faces a myriad of tasks to successfully implement ecosystem management, including the development of new policy and direction. If we assume that the Agency can't do everything at once, the question is: Where should the Agency begin in developing policies and programs related to ecosystem management? Each Roundtable participant was asked to distribute 100 votes among the 14 socioeconomic impact categories and two time frames (short term and long term) to indicate where they thought the Forest Service, as an Agency, should begin. So, if participants felt that it was very important for the Agency to develop policies related to the long-term health and productivity of the ecosystem, they could put all 100 votes in the category of ecosystem health and productivity/long-term. If they felt strongly that the Forest Service should look at the need for policies and programs related to employment/short-term and then timber product outputs/long term, they could put 70 votes in the first category and 30 votes in the second category.

Finally, to provide Forest-level staff some advice on where to start in allocating scarce resources to the evaluation of socioeconomic impacts, we again gave the Roundtable participants 100 votes and asked them to distribute those votes among the 14 socioeconomic impacts categories, short and long term, at three scales—local, State, multi-State region—according to where they thought Forest staff should place their priorities in evaluating socioeconomic impacts.

Appendix B—
ROUNDTABLE PARTICIPANTS

Roundtable participants were selected from nominations submitted by individuals and groups interested in the management and use of the Chequamegon and Nicolet National Forests. We were looking for a diversity of experiences, viewpoints, disciplines, and geographic areas of expertise. Nominators were told that participants would be selected based on the following four criteria:

1. Expertise and experience; recognition as an authority in a pertinent field at some applicable local, regional, or national scale.

2. Familiarity with the socialeconomic issues and concerns facing the Chequamegon and Nicolet National Forests in managing northern Wisconsin forest ecosystems.

3. Interpersonal working style conducive to teamwork, without assurance of consensus, on subjects that may be poorly defined or controversial.

4. Availability and commitment to participate in, contribute to, and follow up on discussions of socioeconomic principles that could guide management of these Forests.

Several screens were used to sift through the more than 70 people nominated to serve on the Socioeconomic Roundtable. We first considered those individuals who had been nominated by more than one group; we viewed these people as having considerable credibility with those concerned about the management and use of the forests, and we placed them on our initial participant list.

We then looked for people with knowledge of the local social and economic conditions—residents of the area and members of organizations with concerns in the area (tribal groups, civic groups, business associations, and other special interest groups). We wanted people who could temper the views of academics and researchers, often removed from the local conditions, with the perspectives of those whose daily lives are impacted by decisions made on the Chequamegon and Nicolet National Forests.

Our next step was to identify potential Roundtable participants who could bring a national perspective to the discussion. Although we generally focused on socioeconomic impacts in areas adjacent to forests, we understood that roundtable participants would be considering the management and use of two **National** Forests, and we needed to be sensitive to the national concerns.

Next, from our initial list, we identified potential participants who would bring some disciplinary diversity to the Roundtable. Many more economists were nominated than any other discipline, and we needed to bring people to the Roundtable who could speak on a broad range of social and economic values.

Finally, we wanted to ensure a link between the two roundtables by having at least one person serve on both roundtables. We looked to see if any people who had served on the Roundtable on Biological Diversity had also been nominated to serve on the Socioeconomic Roundtable. We also invited the co-chairs from the Roundtable on Biological Diversity to observe and act as information resources for the Socioeconomic Roundtable.

These steps produced a list of 22 people. Of this initial list of 22, five were unable to serve; after a few substitutions for balance, we arrived at the final 18 participants. The participants selected reflect, to a certain extent, the backgrounds of the Roundtable chairs; about two-thirds of the participants are economists (divided equally between traditional resource economists and economists with interest and experience in the economic evaluation of non-commodity forest outputs), and one-third have backgrounds in other social sciences. A majority of the participants have a knowledge of forest resource conditions at the local, State, or regional level (Lake States region), and about one-third have primarily a national perspective.

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Appendix C—
SOCIOECONOMIC IMPACT CATEGORIES

Before we convened the Socioeconomic Roundtable, we wanted to reach some understanding of what we actually meant by the phrase "socioeconomic impacts." Our approach to this task was to use a series of Delphi surveys to select socioeconomic impact categories that would be most important in evaluating management actions on National Forests.

The basic Delphi "... is a group of procedures for eliciting and refining the opinions of a group of people" (Weatherman and Swenson 1974). The technique was originally developed in the 1950's at the Rand Corporation for use in studying opinions related to defense issues (Helmer 1967). Variations of the basic Delphi technique have been used quite widely in natural resource fields. For example, Shafer *et al.* (1974) used the technique to provide direction for formulating policies to deal with future environmental problems. Baughman and Ellefson (1983) used the technique to study options for county forest land in Minnesota. Gregersen *et al.* (1989) used a Delphi survey to identify emerging issues in forestry as a tool in research planning.

We decided to use a four-stage Delphi process. In Delphi I, we asked Roundtable participants to brainstorm, either alone or with colleagues, about the potential social and economic impacts that might occur as the result of a forest management decision.

Participants responded with 225 "socioeconomic impacts." Many of the responses were not impacts, but variables to measure impacts. After removing these variables and duplicates from the list, we were left with 114 impacts. Because this would be far too many impacts to handle in this Roundtable, we decided to use impact categories, rather than individual impacts. As a result, we were able to combine the 114 impacts into 27 socioeconomic impact categories. For each category, we developed a list of variables or sub-categories drawn from the Delphi I responses to help define the categories. The variables and sub-categories were not meant to be all inclusive, but were there to help the respondents understand the impact categories.

In the second round of the Delphi, we asked respondents to review the 27 impact categories and indicate (1) if the categories were easily understood, (2) if we had inappropriately grouped any impacts, (3) if we missed or masked an especially important impact in our effort to create categories, and (4) if they could suggest better category labels. Using the input from responses to Delphi II, we combined and refined our 27 categories to arrive at 24 socioeconomic impact categories.

It would be unrealistic to expect forest managers to quantify and/or describe the impacts from each management decision or planning action in all 24 categories. The Wisconsin National Forests do not have unlimited budgets or staff trained to consider all categories. So, in Delphi III, we asked participants to indicate which social and economic impact categories they felt the Wisconsin National Forests **should** consider when making management decisions or developing Forest Plans. We cautioned the participants not to let the availability (or lack of availability) of data or measurement techniques color their decisions. We were interested in the participants' perceptions of "should's," not "could's."

Rather than have participants rank or rate all 24 categories, we asked them to use a three-step process to select their high-priority categories. First, participants selected the five categories that they felt were the most important for the National Forests to consider. Next, for the remaining 19 categories, they selected the five most important. Finally, for the remaining 14 categories, they selected the five most important. At the end of the process, each participant had selected the 15 categories they felt were most important for the National Forests to consider in making management decisions, and they had assigned them priorities as the most important (the first set of five categories selected), second most important (the second set of five selected), and third most important (the third set selected).

The "voting" in response to Delphi III highlighted the importance of 10 impact categories. The importance of the 14 remaining categories was

not as clear; there were votes for all categories, but the number of votes in these 14 categories was significantly lower and more widely distributed than the 10 listed above. So far, the participants had selected primarily economic impacts, and we wanted to give them the opportunity to add several more of the remaining categories if we could obtain agreement on the importance of those categories.

In Delphi IV, we presented the 10 socioeconomic categories already selected. We asked the participants to rank the remaining 14 categories, given those already selected. Participants used the same voting procedure as that used in Delphi III, but instead of selecting the 5 most important, they selected the 2 most important in the list of 14. Of the 12 remaining after this initial selection, they selected another 2. Then, of the remaining 10, they selected a final 2. As a result of this second round of voting, we added 4 more impact categories: local culture/traditions, participatory planning, leadership in management, and economic efficiency.

At the Roundtable, when we selected tools, identified data, and identified impacts of management scenarios, we did so using these 14 socioeconomic impact categories:

- Ecosystem health and productivity
- Social vitality and stability
- Economic structure/activity
- Timber product outputs
- Amenity values
- Non-timber forest product outputs
- Quality of life/economic and social well-being
- Local culture/traditions
- Participatory planning
- Economic health
- Leadership in management
- Recreation and aesthetics
- Economic efficiency
- Employment

Impact categories are list below with some of the variables or factors that helped define each category.

Impacts on the Economy

Employment—numbers, rates, distribution (uneven effects on target groups), cycles, stability, by sector, growth

Economic health—economic growth, development, changes (stable, deteriorating, improving), economic cycles, sales impacts, housing market

Economic structure/activity—mill capacity, economic diversity, economic dependency on natural resources, interdependencies, logging infrastructure, industrial competitiveness, agricultural activity, degree of technical development, value-added, infrastructure/services

Impacts on Recreation and Aesthetics

Recreation/aesthetics—use (local vs. non-local, special use facilities), expenditures, quality of experience, perceptions of experience

Amenity values—spiritual, positive aspects of the natural environment, intrinsic values, existence value

Social and Cultural Impacts

Quality of life—charity/philanthropy, civil unrest/crime rate, community identity, self determination, self-governance, communication/isolation, educational opportunities, contemporary infrastructure, health/environmental quality

Culture/traditions—community values, "corporate" knowledge

Social vitality and stability—family structure/stability, community stability, social cohesion, diminished sense of community history, local leaders and organizers, quality of local government, rights or prior claims recognized by law, intergovernmental and intercommunity relationships

Impacts on Forest Product Outputs

Timber product outputs—sustained yield of timber products, timber availability, volume of product harvested (a working forest)

Non-timber forest product outputs—subsistence uses, miscellaneous forest products (mushrooms, taxol, Christmas trees), grazing

Impacts on Management

Participatory planning—generating acceptance and support of management activities, exchanging information or ideas, reaching collective goals, development of interest groups, advocacy

Leadership in management—serving as a role model for other agencies, facilitating the evolution of a natural resource management paradigm

Economic efficiency—cost effectiveness, productivity, is a management action being carried out in the most economically efficient manner

Impacts on the Environment

Ecosystem health and productivity—sustainability, biodiversity, threatened and endangered species, air and water quality, quality of habitat, ecosystem quality, research opportunities, land ownership patterns

Appendix D—
MANAGEMENT SCENARIOS FOR THE WISCONSIN NATIONAL FORESTS

We spent much time before the Roundtable trying to understand how the Forest Service defines ecosystem management. Time was also spent during the Roundtable helping participants understand what the Forests and the Agency mean by that term. At the time of the Socioeconomic Roundtable, we could agree that the term ecosystem management refers to a management philosophy and world view, not to specific management tools. Since the Roundtable, our understanding of ecosystem management and how it might be practiced on the National Forests has made enormous strides. In the literature we are seeing considerable discussion of the issue, as members of the profession move towards a consensus on just what ecosystem management is (see, for example, Grumbine 1994 and Gerlach and Bengston 1994). However, at the time of the Socioeconomic Roundtable, the idea was still very fuzzy.

To facilitate the evaluation of impacts of ecosystem management, we decided to develop a series of potential management scenarios for the Chequamegon and Nicolet National Forests that would define a range of hypothetical actions that might be considered by the Forests. These scenarios represent various combinations of emphasized uses and values (table 3). All the management scenarios assume the application of ecosystem principles to forest management. These scenarios were developed by the Forest Service task team at the request of the Socioeconomic Roundtable co-chairs and served only as a framework for estimating directional socioeconomic impacts of National Forest management. Their appearance here **does not** imply any commitment by the Forests to follow any of these scenarios—they are not intended for use in the Forest Plan review or revision process for either the Chequamegon or Nicolet National Forest.

Scenario A

This scenario portrays current management of the National Forests in Wisconsin. Land and resource management is guided by Forest Plan management direction, by changed conditions identified by 7 years of plan implementation and monitoring, and by principles of ecosystem management that have gained credibility in the scientific community since Forest Plans were approved. Scenario A was used as the baseline against which changes resulting from the implementation of Scenarios B-D were measured.

Vegetation and Wildlife

Vegetation management emphasizes the quality and quantity of timber production, and habitat diversity (species richness) on a local scale. Disturbance patterns are guided both by desired future conditions described in Forest Plans and by the economics of timber growth, quality, and salvage opportunities. Habitat for game and non-game species associated with disturbed and early-successional habitat is emphasized and enhanced where vegetation is actively managed. Species associated with undisturbed habitat are provided for by special management areas (see next page). Habitat for threatened, endangered, and sensitive species is protected, and enhanced by active management where necessary.

Roads

Road standards and locations are designed to provide cost-efficient timber hauling, public access, and user safety. Several roads are closed between timber sales to provide wildlife habitat isolated from frequent human contact, to provide nonmotorized recreation opportunities, to minimize road maintenance costs, and to limit soil and water degradation.

Economic Factors

Due to the emphasis on long-term commercial timber value (quality sawtimber) and non-timber resource values, costs of the timber program exceed revenues in the short term.

Recreation

Recreation management emphasizes camping and lake access in developed sites and dispersed hunting and fishing throughout the two Forests. Snowmobile trails and hunter walking trails are the most abundant dispersed recreation facilities. Although Forest Plans would

Table 3.—*Outputs and acreage devoted to various uses for each management scenario*

Resource	Management scenarios				
	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Recreation visitor days					
Hunting	231,000	<	<	>	<
Fishing	412,000	>	>	<	—
Developed sites	560,000	—	>	<	—
Dispersed recreation	764,000				
Motorized recreation					
Pleasure driving	N/A	—	>	<	—
Snowmobiling	N/A	</—	>	—/>	—
Other	N/A	<	>	—/>	—
Nonmotorized recreation					
Extensive	N/A	>	</—	<	—
Intensive	N/A	>	>	<	—
Area by use (in acres)					
River corridors	23,000	>	—	<	—
Wilderness	44,000	—	—	—	—
Semi-primitive non-motorized area (SPNM)	65,700	>	>	<	>
Destination sites	N/A	—	>	<	—
Roads Open mi.	7,000	<	<	>	—
Old growth	20,000	>	—/>	<	>
Habitat types					
Early (0-30 years)	598,000	<	<	>	<
Late (60+ years)	420,000	>	>	<	>
Special areas		>	—	<	—
(Research Natural Areas (RNAs, Botanic, Others))	760,000				
Large block					
Forested	N/A	>	—	<	>
Non-forested	N/A	>	<	<	<
Harvest volume					
1995					
Million board feet	105-115	85-95	50-60	120-130	0
Percent in:					
Sawtimber	10-20	10-20	15-25	10-120	0
Pulpwood	80-90	80-90	75-85	80-90	0
2015					
Million board feet	115-125	90-100	60-70	150-160	0
Percent in:					
Sawtimber	35-45	15-25	20-30	35-45	0
Pulpwood	55-65	75-85	70-80	55-65	0
Harvest area (in acres):					
Even-aged	679,000	372,000	350,000	710,000	0
Uneven-aged	356,000	558,000	150,000	404,000	0
Total acres	1,035,000	930,000	500,000	1,114,000	0

— No change from current forest plans.
> Increase from current forest plans.
< Decrease from current forest plans
N/A Figures for current management are not readily available, but category is included because we can estimate if program will increase/decrease from current level.

eventually reduce open road mileage on the two Forests, wildernesses represent the only large (5,000- to 8,000-acre) blocks of land completely closed to vehicle access.

Special Management Areas

Timber production is limited or prohibited by other resource values on lands in the following categories: designated wilderness, candidate wild and scenic river corridors, research natural areas, ecological special areas (e.g., sensitive plant locations), semi-primitive nonmotorized recreation areas, lowland forests, riparian areas (with special emphasis on trout streams), and visually sensitive areas along main roads and recreation use areas.

Scenario B

Under this scenario, the enhancement of biological diversity on a regional scale would receive increased emphasis in National Forest management in Wisconsin.

Vegetation and Wildlife

Vegetation management on the National Forests in Wisconsin would include some lands specially designated to feature ecosystems, such as old-growth forest, that are poorly represented in the Lake States region. Disturbance patterns in those areas would be designed to mimic natural cycles. Some forested lands might be "understocked," while others might be "overstocked" from the viewpoint of optimal timber growth. Some lands might be managed for longer rotations (life cycles) than optimal for growth; others might be managed for shorter than optimal rotations. Salvage opportunities might be foregone. These lands would provide habitat for plants and animals associated with late-successional ecosystems and those that are intolerant of disturbance.

Vegetation management outside of the areas described above would emphasize timber growth, yield, and quality while applying ecosystem principles, protecting the environment, and accommodating other values (such as recreation sites and sensitive resource locations) on a site-specific basis. These lands would best provide habitat for species such as game animals associated with early-successional vegetation, and/or those that tolerate periodic habitat disturbance.

Roads

Habitat isolation from human contact would be encouraged by road closure and obliteration within some of the areas designated for reduced harvesting frequency. Narrow, unsurfaced roads would be used where unbroken forest canopy cover is emphasized. Higher standard roads and more open roads would be found on lands where commodity production and game habitat management are emphasized.

Economic Factors

Forest management costs would be higher than revenues on those acres where ecosystem goals are emphasized over cost recovery. However, cost recovery would be of primary importance in other areas. With the increasing value of large-diameter sawtimber trees in the future, the imbalance of costs and revenues would decrease over the long term.

Recreation

The recreation program would be designed for compatibility with late-successional vegetation and wildlife habitat isolation on lands designated for that emphasis. In those areas, nonmotorized access and low user density would be favored; there would be few visual effects of management. In those same areas, motorized recreation and hunting opportunities would decline with road closures and a gradual decline in aspen and openings. Outside of areas with reduced harvesting frequency and reduced open road density, recreation opportunities would be similar to those described for Scenario A.

Special Management Areas

Existing special management areas would be retained, and some additional areas would be designated for reduced timber harvesting frequency. The number, size, shape, and distribution of these additional areas on the landscape are still open to question.

Scenario C

Under this scenario, forest management would emphasize short-term economic efficiency in all programs. Where resources generate revenue to

the Treasury, costs and benefits would be based on dollar values. Where resources do not generate revenue, other acceptable measures would be applied.

Vegetation and Wildlife

Timber management would occur only on those lands and in those vegetation types where projected revenues would exceed management costs in the short term. In general, this approach would favor the harvesting of sawtimber and would reduce the periodic harvesting of smaller trees to optimize growth and quality in overstocked stands. Clearcutting would be favored where adequate, cost-effective reforestation could be assured. Low-value salvage opportunities might be foregone.

The overall reduction in acres harvested could benefit some plants and animals intolerant of disturbance. However, forest cover types with lower economic value tend to be dominated by small-diameter trees and/or early-successional species that do not provide the same benefits as late-successional forest ecosystems. Wildlife habitat enhancement would rely heavily on partnerships with organized groups for funding. Based on past experience, projects would favor habitat for game species. Habitat for threatened, endangered, and sensitive species would be protected, but active management for enhancement would be limited by investment costs.

Roads

Access for timber removal would generally be by existing roads, with limited low-standard road construction to access especially valuable timber. More high-standard local roads would be closed than under Scenario A, to reduce maintenance costs. Low-standard roads with minimal investment and maintenance requirements might be left open.

Economic Factors

Timber revenues would exceed timber management costs in the short term. Below-cost timber sales would not occur, even if offset by long-term economic benefits or benefits to non-commodity resources.

Recreation

The recreation program would emphasize high-intensity and high-density use to benefit the largest number of users per dollar invested. This scenario might include Congressional approval to collect user fees for day use and dispersed use, as a source of recreation revenue. Partnerships with organized user groups would augment the recreation budget. Based on past experience, partnership projects would favor hunters, anglers, and snowmobilers. Low-use facilities might be phased out. The visual effect of harvesting would be less widespread than in Scenario A. However, there might be adverse visual effects of mortality in forests of short-lived low-value trees.

Special Management Areas

Special management areas would be similar to those in Scenario A. In addition, the frequency of timber harvesting would be reduced on those acres where management costs would exceed revenue.

Scenario D

Under this scenario, the primary emphasis of National Forest management in Wisconsin would be to produce abundant, affordable wood products in response to society's demands.

Vegetation and Wildlife

Vegetation would be managed to optimize growth, yield, and timber quality in a mix of products proportionate to demand. Wildlife species (including many game animals) that benefit from vegetative disturbance and early-successional vegetation would be favored. Habitat for threatened, endangered, and sensitive species would be protected.

Roads

Roads would be constructed to the extent and standard needed to optimize the economics of timber removal. The pattern of open and closed roads would be similar to that in Scenario A.

Economic Factors

Costs would exceed revenues overall, because the decision to harvest timber would not be

limited by cost-benefit factors. Over time, the degree to which costs exceed benefits for the two Forests could drop if higher value sawtimber were emphasized over lower value pulp products.

Recreation

Recreation uses compatible with an intensive timber program would continue; those that conflict with timber management would decline. Visual quality would be affected by the extent and frequency of timber harvesting.

Special Management Areas

Special management area restrictions on timber harvesting would be similar to those in Scenario A for designated wilderness, research natural areas, and ecological special areas. There would be fewer limitations than in Scenario A on timber production in riparian areas, visually sensitive areas, candidate wild and scenic river corridors, lowland forests, and semi-primitive nonmotorized areas.

Scenario E

Under this scenario, vegetation management on the National Forests in Wisconsin would be custodial in nature, rather than emphasizing active management for ecosystem restoration and commodity production. Management of recreation facilities would be similar to that in Scenario A. (This scenario would likely require a change in the legal mandates for National Forest management.)

Vegetation and Wildlife

There would be no routine commercial timber management or wildlife habitat manipulation. Vegetation would pass through successional stages, gradually moving toward mature forest except for localized natural disturbances. In the interim, forests dominated by short-lived tree species would be susceptible to insect and disease infestation, and (in some areas) widespread mortality. Salvage operations would be minimal under this scenario. Wildlife species (including game animals) associated with early-successional forest would gradually be replaced by species associated with mature forest. Only habitat for threatened, endangered, and sensitive species would be actively managed if needed to sustain habitat over time.

Roads

There would be no new road construction or reconstruction. The open and closed road pattern would be similar to that in Scenario A.

Economic Factors

There would be no timber-related costs or revenues under this scenario.

Recreation

The recreation program would be similar to that in Scenario A, except that hunting would gradually decline with the reduction in game populations. Visual quality would be unaffected by timber harvesting, but might be adversely affected where forest mortality was widespread. Existing developed sites and trails would remain in place. The mix of motorized and nonmotorized access would remain essentially unchanged.

Special Management Areas

Special management areas would be similar to those listed under Scenario A. In addition, timber harvesting and other active vegetation management would be limited on all National Forest lands in Wisconsin.

APPENDIX E—

COMPLETED WORKSHEETS DESCRIBING TOOLS FOR EVALUATING SOCIOECONOMIC IMPACTS

Tool: **Behavior-Setting Analysis**

Impact category: Quality of life, culture/tradition, social vitality/stability

Reference/Source: Fox, Karl. 1985. Social system accounts: linking social and economic indicators through tangible behavior settings. Hingham, MA: Kluwer Academic Publishers. 221 p.

Data requirements: Description of settings, activities, and the physical support necessary for their existence

Appropriate for measuring:

x	short-term impacts
x	long-term impacts
x	local impacts
____	regional impacts

Advantages:

1. Provides an objective account of local life and characters (a sense of place)
2. Enables consideration of impacts on everyday life of more abstract policy decisions and economic measures
3. Juxtaposes ordinary, everyday life activities with place characteristics
4. Involves local perceptions and values of citizens
5. Helps to identify the significant places in a region or a community

Disadvantages:

1. In its original conception, takes too much time; however, it can be used in combination with other techniques, which increases its efficiency

Knowledgeable roundtable participant: F. Sancar, University of Wisconsin-Madison

Tool: **Case studies**

Impact category: All impact categories

Reference/Source: e.g., USDA Forest Service, Northern Region Study Comparing Forests (public acceptance), Army Corps of Engineers (Fort Bellivoir-Institute of Water Resources)

Data requirements: Moderate

Appropriate for measuring:

x	short-term impacts
____	long-term impacts
x	local impacts
x	regional impacts

Advantages:

1. Simple but effective
2. Can extrapolate to other similar projects
3. Analyze success stories and learn from them
4. Easy to explain
5. Could be done as part of monitoring

Disadvantages:

1. After the fact
2. Limits to how work can be generalized
3. Selling the concept
4. Hard to isolate effects over the long term

Knowledgeable roundtable participant: Jeff Stier

Tool: **Content Analysis**

Impact category: Recreation/aesthetics, amenity values, quality of life, culture/tradition, timber product outputs, non-timber product outputs, participatory planning, leadership in management

Reference/Source: Weber, Robert P. 1990. Basic content analysis. Sage Univ. Pap. 49. Series: Quantitative applications in the social sciences. London: Sage Publications. 95 p.
Gamson, William. 1975. The strategy of social protest. Homewood, IL: Dorsey Press. 217 p.

Data requirements: Printed material such as newspapers, advertising, appeals/formal comment, open-ended questions on surveys

Appropriate for measuring:
- x short-term impacts
- x long-term impacts
- x local impacts
- x regional impacts

Advantages:
1. Cost effective
2. Allows you to consider trends over a long time period
3. Qualitative

Disadvantages:
1. Labor intensive
2. Time consuming
3. Built-in bias—what did the editors let in?
4. Questions you can ask are limited by the type of material

Knowledgeable roundtable participant: Linda Kruger

Tool: **EDDAPS (Economic Diversity and Dependency Analysis)**

Impact category: Employment/economic structure

Sources: Forest Service, Rocky Mountain Regional Office, Lakewood, CO.

Data requirements: IMPLAN database, paradox database software

Appropriate for measuring:
- x short-term impacts
- ___ long-term impacts
- x local impacts
- x regional impacts

Advantages:
1. Measures economic diversity
2. Assists in aggregating counties for IMPLAN analysis
3. Published analysis showing results/example of an economic analysis done this way for FS region

Disadvantages:
1. Same limitations as IMPLAN
2. Sectors too gross, too aggregated
3. Still working on the 90 database update that will read IMPLAN files

Knowledgeable roundtable participant: (Referenced in Schuster, E.G.; *et al.* 1993. A guide to computer-based analytical tools for implementing National Forest plans. Gen. Tech. Rep. INT-296. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 269 p.)

Tool: **Expert Opinion**

Impact category: All impact categories

Reference/Source:

Data requirements: Low—find the expert (may not always be an academic, e.g., could be an avid recreation user or knowledgeable employee)

Appropriate for measuring:

x	short-term impacts
x	long-term impacts
x	local impacts
x	regional impacts

Advantages:

1. Experts can lead to other experts
2. Convenience and timeliness
3. Short time frame for results
4. Good, direct information

Disadvantages:

1. Administrative overhead high
2. Subjective approach (less defensible), qualitative
3. Not necessarily representative/random

Knowledgeable roundtable participant: Jay O'Laughlin

Tool: **Ethnographic interviews**

Impact category: Recreation/aesthetics, amenity values, quality of life, culture/tradition, social vitality/stability, timber product outputs, non-timber product outputs, participatory planning

Reference/Source: Spradley, James P. 1979. The ethnographic interview. New York: Holt, Rinehart and Winston. 247 p.

Data requirements:

Appropriate for measuring:

x	short-term impacts
x	long-term impacts
x	local impacts
x	regional impacts

Advantages:

1. Incredibly rich
2. Good response from participants—interviewees like it!
3. Provides cultural awareness and insight. Opportunities for serendipity
4. Has meaning and value

Disadvantages:

1. Not generalizable
2. Not quantitative
3. Time consuming
4. Labor intensive
5. Requires lots of training
6. Interpretation and analysis can be challenging

Knowledgeable roundtable participant: Linda Kruger

Tool: **E-Z Impact**

Impact category: All impact categories

Reference/Source: Tom Boniksen, Texas A&M

Data requirements: Directional impact judgments, variable definitions, and ratings or ranks

Appropriate for measuring:

x	short-term impacts
x	long-term impacts
x	local impacts
x	regional impacts

Advantages:

1. Provides overall approach/methodology
2. Considers interactions among diverse variables
3. Data requirements are not demanding
4. Involves diverse interest groups actively in model building
5. Efficient—can be applied in intensive 2-3 day workshops

Disadvantages:

1. Modeling technique makes linear simplifications when the actual phenomena may be non-linear

Knowledgeable roundtable participant:

Tool: **Focus Groups**

Impact category: Economic health, recreation/aesthetics, amenity values, quality of life, culture/tradition, social vitality/stability, non-timber product outputs, participatory planning, leadership in management, ecosystem health/productivity

Reference/Source: Bill McLaughlin (University of Idaho), examples from EPA, Bob Ditton (Texas A&M)

Data requirements: Low

Appropriate for measuring:

x	short-term impacts
___	long-term impacts
x	local impacts
x	regional impacts

Advantages:

1. Can use simulation or multimedia presentations
2. Immediate feedback
3. Better than surveys for feedback on aesthetics
4. Relatively inexpensive

Disadvantages:

1. Need person experienced in process to work with group
2. Subjective, may not be representative
3. Should not use as sole public involvement tool

Knowledgeable roundtable participant: John Bergstrom

Tool: **FORPLAN**

Impact category: Timber product outputs

Reference/Source: Hoekstra, T.W.; *et al.*, eds. 1986. FORPLAN: an evaluation of a forest planning tool. In: Proceedings of a symposium; 1986 November 4-6; Denver, CO. Gen. Tech. Rep. RM-140. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 164 p.
O'Toole, Randal. 1983. A citizen's guide to FORPLAN. Eugene, OR: Cascade Holistic Economic Consultants. 50 p.
Kathy Sleavin, Forest Service, Fort Collins Computer Center, Fort Collins, CO.

Data requirements: Horrendous. User supplied. Inventory (FS), cost, benefits, constraints

Appropriate for measuring:

x	short-term impacts
x	long-term impacts
x	local impacts
___	regional impacts

Advantages:

1. Computerized, been widely used, and recursive
2. Optimizing model
3. Runs on PC now
4. Supported and well documented
5. Forces people to look at things they don't ordinarily look at
6. Several FORPLAN spinoffs are an improvement on the original GTR-INT-296

Disadvantages:

1. Optimizing model
2. Obscure data requirement
3. G in/G out
4. Linear production function
5. Spatial relationships not accounted for
6. Does not deal well w/ non-market commodities because data are not available
7. A problem of answering "what if" questions/expensive

Knowledgeable roundtable participant:

Tool: **Global Trade Model (GTM)**

Impact category: Timber product outputs

Reference/Source: Buongiorno, Joseph; Gilles, James K. 1983. A model of international trade of forest products (GTM-1). WP-83-63. Luxembourg, Austria: Working Paper, International Institute for Applied Systems Analysis. 24 p.
University of Washington Center for International Trade in Forest Products, Seattle, WA (John Perez Garcia and Peter Cardillechio)

Data requirements: Requires international database. Like TAMM for market economies. Exogenous data for planned economies

Appropriate for measuring:

x	short-term impacts
___	long-term impacts
___	local impacts
x	regional impacts

Advantages:

1. International trade flows
2. Good for regional and international uses
3. Only game in town

Disadvantages:

1. Requires advanced expertise
2. An evolving model
3. Does not deal well w/ hardwoods (suspects)
4. Not widely used

Knowledgeable roundtable participant:

Tool: **IMPLAN**

Impact category: Employment, economic structure/activity, recreation/aesthetic

Reference/Source: Schuster, E G.; *et al.* 1993. A guide to computer-based analytical tools for implementing National Forest plans. Gen. Tech. Rep. INT-296. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 269 p.
Eric Sieverts, Rocky Mountain Forest and Range Experiment Station

Data requirements: Intensive. Estimate of use, expenditure profile (SE Station)

Appropriate for measuring:
- x short-term impacts
- ___ long-term impacts
- x local impacts
- x regional impacts

Advantages:
1. Forest Service personnel are familiar with it--it's widely available and used
2. Can use to evaluate alternatives
3. Convenient, accessible (spreadsheet, PC version)
4. Training is available
5. Has regular updates
6. Considers the entire economy and interdependencies

Disadvantages:
1. Based on national coefficients
2. Difficult to modify for local use
3. Static analysis
4. Tourism not included
5. Resource constraints are not included in the model

Knowledgeable roundtable participant: John Bergstrom and Dan Chappelle

Tool: **Interpretive Structural Modeling**

Impact category: All impact categories

Reference/Source: Warfield, J.N. 1976. Societal systems: planning, policy, and complexity. New York: John Wiley and Sons. 490 p.

Data requirements: Variable definition and interaction matrix

Appropriate for measuring:
- x short-term impacts
- x long-term impacts
- x local impacts
- x regional impacts

Advantages:
1. Provides/generates a shared view of a complex system
2. Forces participants/experts to consider the interactions among variables pertaining to different sectors
3. Reduces/clarifies intractable and complex problems without oversimplification
4. Incorporates all interests without eliminating viewpoints by voting or ranking
5. Rigorous methodology; therefore is defensible
6. Promotes creativity
7. Short and efficient—can be done in 3-4 day workshops

Disadvantages:
1. Results require interpretation by participants--this is not bad in itself; however, the benefits go to participants who then go ahead with decision making
2. Resulting model is specific to the situation, not necessarily usable for other cases

Knowledgeable roundtable participant: F. Sancar, University of Wisconsin-Madison

Tool: **IPASS**

Impact category: Employment, economic structure/activity, recreation/aesthetics

Reference/Source: Olson, Doug; *et al.* 1984. IPASS: An Interactive Policy Analysis Simulation System. Gen. Tech. Rep. PNW-170. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station. 70 p.
Wilbur Maki at the University of Minnesota

Data requirements: Similar to IMPLAN. Has information on population changes, investment, job classifications, public finance

Appropriate for measuring:

___	short-term impacts
x	long-term impacts
___	local impacts
___	regional impacts

Advantages:

1. Same as IMPLAN but allows incorporation for forecasting
2. Allows incorporation for econometric modeling
3. Gets into some of the other social areas, immigration and occupation structure. (govt. expenditures)
4. Good documentation
5. Good for long-term impacts (series)

Disadvantages:

1. Very expensive
2. Requires advanced modeling skill
3. Labor intensive
4. Same as IMPLAN. Not as widely used as IMPLAN
6. Not maintained
7. No training available
8. May have undocumented deficiencies

Knowledgeable roundtable participant: Con Schallau

Tool: **Key Informant Interviews**

Impact category: All impact categories EXCEPT employment, economic structure/activity, and timber product output

Reference/Source: Patton, M.Q. 1980. Qualitative evaluation methods. Beverly Hills, CA: Sage Publications. 379 p.

Data requirements:

Appropriate for measuring:

x	short-term impacts
x	long-term impacts
x	local impacts
x	regional impacts

Advantages:

1. Can tailor questions to fit your needs, tooled to specific interests
2. Many managers already have a "flair" and the public contact skills necessary
3. Relatively inexpensive
4. Relatively quick
5. Great breadth of information
6. Not difficult to implement
7. Useful for identifying issues of stakeholders

Disadvantages:

1. Forest Service often does not have the staff or expertise to do this
2. Looks deceptively easy
3. May be too qualitative—lacks quantitative information and not generalizable
4. Must consider how the information can be used in planning process
5. Questions about validity—interpretation can be skewed

Knowledgeable roundtable participant: Ed Nelson

Tool: **Limits to Acceptable Change (LAC)**
Impact category: Recreation/aesthetics, amenity values
Reference/Source: Stankey, G.H.; *et al.* 1985. The Limits of Acceptable Change (LAC) system for wilderness planning. Gen. Tech. Rep. INT-176. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 37 p.
Data requirements:
Appropriate for measuring:
- x short-term impacts
- x long-term impacts
- x local impacts
- x regional impacts

Advantages:
1. Involves the public
2. Incorporates the Recreation Opportunity Spectrum
3. Establishes social, biophysical, managerial factors and indicators and standards that can be monitored over time
4. Established procedures for determining acceptable changes in the resource
5. Prescribes management actions to take for social/biophysical resource indicators that are at or below acceptable levels

Disadvantages:
1. Data intensive
2. Takes lots of time
3. You usually don't have all the data you'll need

Knowledgeable roundtable participant: Dorothy Anderson

Tool: **Multi-Attribute Modeling**
Impact category: All impact categories
Reference/Source: Arkes, H.R.; Hammond, K.R., eds. 1986. Judgment and decision making: an interdisciplinary reader. Cambridge, MA: Cambridge University Press. 818 p.
Data requirements: Value attributes, importance weights, alternative plans or policies, value functions
Appropriate for measuring:
- x short-term impacts
- x long-term impacts
- x local impacts
- x regional impacts

Advantages:
1. Clarifies factual information versus value judgments (helps to separate facts from values)
2. Classifies sources of disagreement among experts or others with impact perceptions
3. Promotes consensus in evaluations
4. Relatively less time consuming, direct and simple to apply
5. Externalizes judgments of involved parties
6. Helps to achieve accountability for social decisions by making them more transparent

Disadvantages:
1. Results are only as good as (a) the expertise available to participants, and (b) the alternatives available to be evaluated
2. Looks at impacts rather than underlying causes

Knowledgeable roundtable participant: F. Sancar, University of Wisconsin-Madison

Tool: **Non-market Benefit Valuation**

Impact category: Recreation/aesthetics, amenity values, quality of life, culture/tradition, social vitality/stability, timber product outputs, non-timber product outputs

Reference/Source: Winpenny, J.T. 1991. Values for the environment: a guide to economic appraisal. London: HMSO. 277 p. Ken Cordell, Southeastern Forest Experiment Station, Athens, GA

Data requirements:

Appropriate for measuring:

x	short-term impacts
x	long-term impacts
x	local impacts
x	regional impacts

Advantages:

1. Currently being used and accepted
2. Can be used when no other market information is available

Disadvantages:

1. Data intensive
2. Theoretical bases, hard to explain - somewhat esoteric
3. Requires expertise

Knowledgeable roundtable participant: John Stoll

Tool: **Observation**

Impact category: Recreation/aesthetics, amenity values, qualify of life, culture/tradition, social vitality/stability,

Reference/Source: Webb, E.T. 1981. Unobtrusive measures in social sciences. Boston, MA: Houghton Mifflin. 394 p.

Data requirements:

Appropriate for measuring:

x	short-term impacts
x	long-term impacts
x	local impacts
x	regional impacts

Advantages:

1. Unobtrusive—you don't modify a person's behavior by asking questions or other interactions
2. Don't have to worry about cooperation—not taking up a person's time
3. Provides you with a lot of information
4. It's fun to do—gives insight into activities
5. It may be the only way to get some information—you can find out stuff that people would never tell you
6. You get first-hand, real behavior
7. Fits well with regular management activities

Disadvantages:

1. You need to know what you're looking for, but you don't want to pre-determine what you find
2. Sometimes difficult to determine what a behavior means
3. Non-replicable
4. Requires some training
5. Relatively labor intensive

Knowledgeable roundtable participant: Tom Heberlein

Tool: **Rapid Rural Assessment**

Impact category: Quality of life, culture/tradition, social vitality/stability

Reference/Source:

Data requirements:

Appropriate for measuring:

___ short-term impacts
___ long-term impacts
___ local impacts
___ regional impacts

Advantages:

1.
2.
3.

Disadvantages:

1.
2.

Knowledgeable roundtable participant:

Tool: **Recreation Opportunity Spectrum**

Impact category: Recreation/aesthetics, amenity values

Reference/Source: Clark, Roger N.; Stankey, George H. 1979. The Recreation Opportunity Spectrum: a framework for planning, management, and research. Gen. Tech. Rep. PNW-98. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station. 32 p.

Data requirements: Data intensive

Appropriate for measuring:

___ short-term impacts
___ long-term impacts
___ local impacts
___ regional impacts

Advantages:

1. Allows development of alternative management scenarios
2. Matches visitors to recreation areas where opportunities are provided for the kinds of experiences they are seeking
3. It's a regional planning tool
4. Allows mapping of the resource
5. Incorporates resource data you already have
6. Allows for tradeoff analysis with other forest uses

Disadvantages:

1. Requires data on managerial, biological, and social factors
2. Time consuming

Knowledgeable roundtable participant: Dorothy Anderson, Wayne Tlusty

Tool: **REMI**

Impact category: Employment, economic structure/activity, recreation/aesthetics

Reference/Source: Regional Economic Models, Inc. Cambridge, MA

Data requirements: Comes with model based on national data; transaction data, same as IMPLAN

Appropriate for measuring:

___	short-term impacts
_x_	long-term impacts
_x_	local impacts
___	regional impacts

Advantages:

1. Used by all State governments in Lake States
2. Same as IMPLAN
3. Built-in forecasting mechanism
4. Supported and highly computable
5. Training is available
6. Company does the forecast
7. Simulation capability
8. Good for county-level analysis as well as long-term impacts

Disadvantages:

1. Not available for microcomputers
2. Same disadvantages as IMPLAN
3. Same disadvantages as IPASS

Knowledgeable roundtable participant: Dan Chappelle

Tool: **Scenic Beauty Estimation Method (SBE)**

Impact category: Recreation/aesthetics, amenity values

Reference/Source: Daniel, Terry C.; Schroeder, Herbert. 1979. Scenic beauty estimation model: predicting perceived beauty of forest landscapes. In: Elsner, G.H.; Smardon, R.C., tech. coords. Proceedings of our national landscape: a conference on applied techniques for analysis and management of the visual resource; 1979 April 23-25; Incline Village, NV. Gen. Tech. Rep. PSW-35. Berkeley, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Forest and Range Experiment Station: 514-523.

Data requirements: Random slides of landscape settings

Appropriate for measuring:

___	short-term impacts
___	long-term impacts
___	local impacts
___	regional impacts

Advantages:

1. Recognized by the scientific community
2. Involves interested publics
3. The process is well defined and well documented
4. Rates the "beauty" of landscapes and can establish the relative contribution of distinct features to the beauty rating

Disadvantages:

1. Not developed for practical field or local use by field-level professionals

Knowledgeable roundtable participant: Dorothy Anderson

Tool: **Surveys**

Impact category: All impact categories

Reference/Source: Dillman, D.A. 1978. Mail and telephone surveys: the total design method. New York: John Wiley and Sons. 325 p.

Data requirements: Primary data

Appropriate for measuring:

x	short-term impacts
___	long-term impacts
x	local impacts
x	regional impacts

Advantages:

1. Focused directly on interest
2. Flexible for variety of uses, e.g., public or employees
3. Quick response
4. Valuable information if done right
5. Leadership if surveying in new area

Disadvantages:

1. Time consuming
2. Cost
3. Need to follow good survey procedures
4. Need followup

Knowledgeable roundtable participant: Ed Nelson, Dorothy Anderson, John Stoll

Tool: **System Dynamics**

Impact category: All impact categories

Reference/Source: Wolstenholme, E.F. 1990. System inquiry: a system dynamics approach. New York: John Wiley and Sons. 238 p.

Data requirements: Base-line behavior of variables corresponding to impact categories, functional relations describing interaction of paired variables, policy options or alternatives

Appropriate for measuring:

___	short-term impacts
x	long-term impacts
x	local impacts
x	regional impacts

Advantages:

1. Consideration of feedback relations among variables
2. Can accommodate both qualitative and quantitative measures
3. Focuses on system structure rather than symptoms
4. Emphasizes understanding rather than prediction
5. Encourages development of new policies and alternatives
6. Involves diverse groups of expertise and interests

Disadvantages:

1. Simulates long-term impacts and trends—not detailed, specific ones
2. Emphasizes continuous, dynamic relations rather than discrete or catastrophic impacts
3. Requires custommade model; does not provide a template
4. Requires a relatively long-term investment to build a useful model
5. Requires significant input and commitment from agency experts over time
6. Assumes that institutional learning is a main goal

Knowledgeable roundtable participant: F. Sancar, University of Wisconsin-Madison; Andy Ford, University of Idaho; Peter Senge, MIT, Sloan School of Management

Tool: **TAMM (Timber Assessment Marketing Model)**

Impact category: Timber products

Reference/Source: Adams, D.M.; Haynes, R.W. 1980. The 1980 timber assessment market model: structure, projections, and policy simulations. Forest Science Monograph. 22. 64 p.
Pacific Northwest Forest and Range Experiment Station, Portland, OR

Data requirements: Included in the model. It is a spatial equilibrium model

Appropriate for measuring:

___	short-term impacts
x	long-term impacts
___	local impacts
x	regional impacts

Advantages:

1. Only game in town
2. Timber demand and price
3. Forecast timber production and prices
4. Inventory (forecast)
5. Growth
6. Nationally integrated and has national sectors

Disadvantages:

1. Can't get to a local forest level
2. It's highly generic, especially for Lake States
3. Has high level of aggregation
4. Hardwood component is weak
5. Poor for hardwoods, especially w/o apical dominance
6. "ATLAS" aggregated timber analysis system-part
7. ATLAS works poorly on mixed stands, uneven-aged stands and partial cutting.
8. Can't use STEMS or stem/growth and yield projection models
9. We don't have relative density change equations that are needed for the ATLAS model
10. Demand equations aren't very good for the species in this region
11. Strongly oriented to the NW and south

Knowledgeable roundtable participant: Mike Vasievich

Tool: **Total Quality Management**

Impact category: Economic health, recreation/aesthetics, amenity values, timber product outputs, participatory planning, leadership in management, economic efficiency, ecosystem health/productivity

Reference/Source: Deming, FS Washington Office, and R4

Data requirements: Resource materials (books, etc.)

Appropriate for measuring:

___	short-term impacts
x	long-term impacts
x	local impacts
___	regional impacts

Advantages:

1. Improved problem solving
2. Trust building

Disadvantages:

1. Long-term commitment
2. High cost
3. Frustration before payoff occurs
4. High personal transition costs

Knowledgeable roundtable participant: Mike Coffman

Tool: **Visual Monitoring System (VMS)**
Will become Scenic Management System in late 1995

Impact category: Recreation/aesthetics, amenity values

Reference/Source: USDA Forest Service. 1974. The visual management system. National Forest landscape management, Chapter 1, Volume 2. Agric. Handb. 462. Washington, DC: U.S. Department of Agriculture, Forest Service. 47 p.
USDA Forest Service. 1988. Visual management system for the Sawtooth National Forest. Misc. Publ. Ogden, UT: U.S. Department of Agriculture, Forest Service, Region 4. 31 p.

Data requirements: Landscape assessment of land form, water form, vegetative form and rock form, distance zones, and sensitivity-level assessment

Appropriate for measuring:
___ short-term impacts
___ long-term impacts
___ local impacts
___ regional impacts

Advantages:
1. Landscape scale
2. Widely understood within and outside the Forest Service
3. Useful in forest planning and project analysis
4. Currently exists in some form on 190 million acres of FS lands.
5. Will be integrated with ROS soon
6. Currently mandated by FS directive
7. Work well with other resource analysis—it integrates

Disadvantages:
1. Developed primarily for land use planning
2. Many aspects of the process are based on "expert opinion"

Knowledgeable roundtable participant: Most Forest Service landscape architects.

Tool: **Wisconsin input/output model**

Impact category: Employment

Reference/Source: Professor Murphey, University of Wisconsin-Green Bay

Data requirements: Unknown

Appropriate for measuring:
x short-term impacts
___ long-term impacts
___ local impacts
___ regional impacts

Advantages:
1. Data are WI-specific

Disadvantages:
1.

Knowledgeable roundtable participant:

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Jakes, Pamela; Harms, Jan.
1995. **Report on the socioeconomic roundtable convened by the Chequamegon and Nicolet National Forests**. Gen. Tech. Rep. NC-177. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 62 p.

Provides a summary of recommendations relating to the evaluation of the socioeconomic impacts of ecosystem management..

KEY WORDS: Socioeconomic impacts, ecosystem management, resource management, public lands.

Our job at the North Central Forest Experiment Station is discovering and creating new knowledge and technology in the field of natural resources and conveying this information to the people who can use it. As a new generation of forests emerges in our region, managers are confronted with two unique challenges: (1) Dealing with the great diversity in composition, quality, and ownership of the forests, and (2) Reconciling the conflicting demands of the people who use them. Helping the forest manager meet these challenges while protecting the environment is what research at North Central is all about.